

APPENDIX K – AGENCY AND PUBLIC COMMENTS RECEIVED ON THE JULY 15, 2002 DRAFT MINIMUM FLOWS & LEVELS DOCUMENT

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Received from Rim Bishop on July 23, 2002

Would you see that the following comments are forwarded to the appropriate SFWMD staff member please?

1. Page 1, third line from bottom - The probably should be something between "River and" and "occur."
2. Page 12, paragraph one under Pre-Development Hydrology - The word "conditions" is misspelled.
3. Page 13, paragraph 2, second to last line - "if" should be "of."
4. Page 32, second to last paragraph - To which wellfields was water diverted? How much, and how often was it taken? Why report Lox River District flow at gallons per hour, why not gallons per day?
5. Page 34, last paragraph - The opening sentence makes it sound like the C-14 feeds the Lox Slough. To the best of our knowledge, it does not.
6. Page 44, second to last paragraph - More detail, e.g. specific user allocations, should be provided.
7. Page 56 - "Wellfield Pumping" section - Shouldn't there be something after the last word of this section?
8. Page 61, table 13 - Use periods consistently within the table.
9. Figure 14 - It is difficult to understand why the watershed is deemed to include areas east of Military Trail and south of Indiantown Road.
10. Page 64 - Given the limited permeability of soils beneath the C-18, the "potential influence" should be discussed in greater detail. In fact, there is very little if any such potential.
11. Page 66, first paragraph - The word "available" is misspelled.
12. Page 95, paragraph beginning "Figure F-4" - "is located" should have a space between the words, and the word "Fork" should probably follow "Northwest."
13. Page 104 - There is no appendix "O" or "I", and we would very much like to review these before the report is finalized.
14. Page 107, first paragraph - My recollection is that the Northern Palm Beach County Water Resource Plan had done a more complete job of quantifying these impacts than this section implies.
15. Page 162 - Seacoast renews its concern, expressed in comments offered earlier to SFWMD, that the concept of "indirect withdrawal" is not technologically defensible and allows SFWMD far too much discretion.

We hope that you find these comments useful, and we look forward to reviewing a subsequent draft prior to adoption.

Thank you.

Rim Bishop
Seacoast Utility Authority
4200 Hood Road
Palm Beach Gardens, FL 33410

Received from Rim Bishop on July 25, 2002

We are pleased to help with the editorial aspects of the report, but we respectfully note that in the past, our spelling and punctuation comments were the only ones that appear to have been incorporated in subsequent drafts. We believe that there is a very important and clearly unintended factual misrepresentation in this draft that must be addressed.

I am sending the same comments again to draw your attention to comment no. 9 below, and to strongly suggest that the Loxahatchee River watershed boundaries established in this draft are simply wrong. Unless a reasonable scientific case can be made for including areas south of Indiantown Road and east of Military Trail, those areas, at minimum, should be excluded.

Rainfall in this area does not, can not, and, under the plans of which we are aware, will not find its way to a point upstream of the Loxahatchee River salt water interface. It all goes to tide well downstream of that point, and I'm reasonably certain that at least as much flows south (away from the estuary) as flows north. Accordingly, the area simply can not contribute any storm water to the restoration program, and it therefore is not part of the watershed.

Further, one can not scientifically link ground water withdrawals originating south of Indiantown Road and east of Military Trail to the Loxahatchee River watershed. It seems that doing so would require evidence that ground water withdrawn from this area would otherwise make its way to a point in the river upstream of the salt water interface, and that simply is not the case. Accordingly, since the area has no identifiable hydraulic connection to the Loxahatchee River, it should not be part of the watershed.

Please either provide scientific support for including this area in the watershed or revise the report to exclude it. This is a relatively small item, and correcting the report as noted takes nothing away from the central message.

We look forward to your response. Thank you again for the opportunity to comment.

Would you see that the following comments are forwarded to the appropriate SFWMD staff member please?

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We hope that you find these comments useful, and we look forward to reviewing a subsequent draft prior to adoption.

Thank you.

Rim Bishop
Seacoast Utility Authority
4200 Hood Road
Palm Beach Gardens, FL 33410

To: John G. Zahina, Cathy McCarty, Patricia Walker, Marion Hedgepeth
From: Alfred Mueller, Jr.
Subject: July 15, 2002 Draft MFL for Loxahatchee River & Estuary
Date: July 26, 2002

Protection of the healthy floodplain swamp community that currently exists in the Cypress Creek tributary is necessary at this time. Cypress Creek enters the Northwest Fork upstream of river mile 10.2, the area that SFWMD staff concluded as currently representing an unharmed, healthy, sustainable floodplain swamp community. Protection of the Cypress Creek healthy floodplain swamp community should be established through the concurrent development of a MFL for Cypress Creek where Cypress Creek joins the Northwest Fork.

Table 23 on page 97 notes that Cypress Creek contributed 26-32 percent of the average daily flow delivered to the Northwest Fork. During the 1980-81 drought Cypress Creek contributed 39-40 percent of the average flow to the Northwest Fork; and during the 1989-90 drought, 34-47 percent of the average flow was contributed by Cypress Creek. Please also note that the listed average flows for Cypress Creek never fell below 30cfs! Cypress Creek is the second largest contributor to the Northwest Fork.

The subject July 15th document clearly indicates that the MFL for Cypress Creek should be no less than 30cfs. The first bulleted item of the Chapter 5, Chapter Summary on page 140 reads as follows: "Long-term flow records for the Loxahatchee River indicate that average flows during the dry season (October 16-May 14) are 70cfs. During extremely dry conditions, such as existed during the 1980-81 and 1989-90 droughts, dry season flows from Lainhart Dam averaged between 26-35cfs (Table 23)." Please note in Table 23 that dry season flows from Cypress Creek averaged consistently 30cfs during the 1980-81 and 1989-90 droughts almost matching and at times exceeding the flow from Lainhart Dam!

Section 373.0421(2), F.S., provides that if it is determined that water flows or levels will fall below an established MFL within the next 20 years or that water flows or levels are presently below the MFL, the water management district must develop and implement a recovery or prevention strategy. Without the establishment of the MFL, the foregoing protection is more limited. That is why establishing a MFL for Cypress Creek concurrently with a MFL for the Northwest Fork is necessary now!

Let's maintain Cypress Creek's current and very significant contributory flow through the establishment of a Cypress Creek MFL of 30cfs concurrently with a Lainhart Dam MFL of 35cfs. A Cypress Creek MFL of 30cfs is needed now before the issuance of new consumptive use permits in the area have an impact on current documented Cypress Creek flows! The healthy floodplain swamp community that currently exists in the Cypress Creek tributary deserves to be protected as well as downstream Northwest Fork benefits that this contributory flow provides.

Attached are my preliminary comments on the new MFL document's "Executive Summary" and a note on the new "reservation" paper. I have not yet sent this to the Board and I am looking for feedback.
Many thanks. Patrick HAYESPATJ@AOL.COM 747-6397

Date: July 19, 2002
From: Patrick Hayes :HAYESPATJ@AOL.COM 747-6397
To: SFMWD Governing Board & Staff
Re: July 15, 2002 Document for MFL's on the Loxahatchee River

General Comments Regarding the Executive Summary

Although the District has done an excellent and extensive job on preparing the "flow" perspective for the Northwest Fork of the Loxahatchee River, I feel extremely misled calling this the "MFL for the Loxahatchee River and Estuary."

The Executive Summary makes it clear on several occasions that this is a "flow" document, for the Northwest Fork only. No discussion at all is evident of "levels", and many critical components of the River (The Slough, The Overall Natural Watershed, and Cypress Creek, to mention a few) are excluded or need significantly more attention.

Many people I know are quite disappointed that the "Watershed", as artificially constructed by the District, excludes much of the southern portion of the River's "Historic Slough". To minimize the special extent of this River's Watershed in the face of many Federal (CERP) and Local Projects which will reconnect the entire southern area of the River's Historic Watershed, seems inappropriate and contrary to the District's committed effort to "get the water right" (to borrow a phrase from the South Florida Ecosystem Taskforce). To exclude a "level" and "flow" regimen for the major southern slough of the river seems quite shortsighted and different from the other MFL's I've studied for comparison.

Staff and District Directors have officially stated that the River has not declined since 1985. It would appear, however, that the current document "declares" another two miles of River "significantly harmed". This seems to be the justification for reducing the MFL recommendation of 70cfs in the previous May 2001 MFL Document, to 35cfs in the current Document.

It think it is unconscionable that Staff recommend less water for the River and, thereby more water for consumptive use as a reward for 20 years of mismanaging the River's natural system causing another two miles of destruction.

The Summary also indicates that even at this level, the District cannot meet fresh water demands during the dry season and must, therefore, construct a "Recovery and Prevention Strategy". Since the River's "Wild & Scenic" designation in 1985, and the Federal & State Mandates to Restore, Protect and Preserve this national treasure, the "loophole"..." to provide sufficient flow whenever possible" continues to allow the River's demise. Yet during the last 25 years sufficient water has been found to increase consumptive use permits in the River's watershed by over 100-million gallons a day. When is this blatant contradiction going to end, and the River receive its "fair share" of vitally nourishing water?

Further comments to follow. pjh

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R/E :

the "RESERVATION" Document ---- the only parties with " legal" standing with respect to " the WORDA 2000 Base line," and the " savings clause" ---are "permit holders" (which excludes all natural systems, i.e., rivers, sloughs estuaries, etc.). Also the "legal" status excludes all "Storm water runoff" . When I

questioned Mr. Ammon r/e the Natural system --- and specifically the Loxahatchee River --- he said that the River is "entitled to only the water that we have been giving it " --- when I reminded him that during the "wry season" that the District doesn't give us any water, and that this would imply, we have on standing, In "WORDA 2000 Base line" , and that under the "savings clause" the River would be entitled to " no water " during the critical dry season . He stated that was correct. And repeated that the Natural system was only entitled to the water that the District had been giving it, as reflected in the historical levels over the last 30 or so years.

The implications of this for the Natural system, and especially the River's are unfair, inappropriate and disastrous. It is simply not good "policy," after 30 years of refusing to set aside water, set MFL's, or develop Reservations, that our "base line" should now be "zero."

Further comments to follow --- PJH

# Loxahatchee River District

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Richard C. Dent, Executive Director



*Award Winning  
Regional Wastewater Facility  
Best in Nation, E.P.A.  
Best in State, D.E.P.*

July 29, 2002

Mr. John G. Zahina  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33416

Re: Loxahatchee River and Estuary MFL

Dear John,

Don't Panic!! I think you'll appreciate most of these comments.

Thank you for the opportunity to review the referenced document. Given the 'just hold the line' directive, I believe the Water Management District staff has done a good job of describing the methodology employed and developing reasonable technical criteria.

Enclosed is my initial list of comments and questions relative to the draft technical document. While I have included certain opinions concerning the policy nature of decisions under which the draft was developed, my major intent is to assist in clarifying and enhancing the technical efficacy of your effort. I have also enclosed several other technical references that may be useful.

John, please give me a call to arrange a meeting at your convenience to go over the issues presented. Thanks again for a job well done.

Sincerely,

Richard C. Dent  
Executive Director

Encls.

/dh

1. **Maximum flows, River** -- the reference to maximum flows is incomplete with information omitted on the third line up from the bottom of page 1.
2. **Maximum flows, C-18** -- given that the title speaks to the estuary, the need to set a flow limit through the s-46 structure should be further discussed and scheduled for future consideration.
3. **Seasonal flows** -- the exploration of seasonal flow minimums and consideration for future MFL inclusion is encouraged and further mention, beyond that contained in the MFL document, is requested.
4. **MFL definition** -- references in the executive summary, on page 3 and elsewhere in the document tend to imply that the 'significant harm' criteria is the only definition provided by law. Perhaps a clarification that this definition is the one that staff has been tasked with using would be helpful.
5. **Recovery and prevention strategy** -- since the river is the resource sought to be protected by the MFL and the subject of the technical document, perhaps priority and emphasis on page 7, paragraph 3, and elsewhere (Chapter 6) should be modified. State that the goal is 'to take actions to achieve the MFL criteria, while providing sufficient...'.
6. **Rainfall A** -- reference to a Jupiter rainfall record of 90 or 95 years, as given in the narrative and Figure 3 on page 11, may be misleading. My understanding is that the record prior to 1960 is incomplete.
7. **Rainfall B** -- the enclosed report on rainfall contains much of the same information developed by the SFWMD. However, two observations in the 1997 document may be helpful. First, the spatial distribution of rainfall in the watershed is very important and not considered in the MFL document. Pages 7 and 8 of the enclosed report documents significant wet season variances in rainfall amounts between eastern and western locations. Since future modeling will be rainfall driven, this factor should be incorporated. The second observation relates to rainfall frequency and intensity. Light rainfall events do not greatly add to storage as much is lost to evapotranspiration and, extreme events are difficult to effectively capture for storage.
8. **Tributary flows** -- Table 1 on page 17 indicates that flow data from Cypress Creek and Hobe Groves Ditch are available for a continuous POR through 1991. Please help me find the full 1981-1991 record (perhaps it is in one of the appendices).
9. **Tidal prism** -- the USGS data referenced on page 18 is valid but differs somewhat from the referenced work by Chiu found on page 22.
10. **Groundwater inflow A** -- Although the contribution of groundwater flow is addressed later in the MFL document, perhaps references to total freshwater flow on pages 19, 20 and 21 should clarify surface water contributions only. Discussions on page 97 could also benefit from this clarification.
11. **Loxahatchee estuary** -- the narrative on the estuary presented on pages 22 through 30 contains several references to upstream areas, JD Park, floodplain swamp community, etc.
12. **Submerged aquatic vegetation** -- the discussion on Johnson's seagrass on page 26 is important and further research has been published. The enclosed report by Ridler, et al is a follow up to the 1999 research and documents the continued presence of this threatened species within the estuary. Further consideration of this plant, possible as an indicator for future MFL rules, is encouraged.

13. **Benthic macrofauna** -- in addition to the estuarine data referenced, the LRD has also presented information in the wild and scenic reach of the river. Although not yet published, the results of the freshwater research were presented at the 2001 Loxahatchee River Symposium and the abstract and salient graphics are enclosed. In general terms, the two stations (at Trapper's and at Lainhart) show healthy freshwater communities and compare favorably with earlier work conducted by Rudolph. As relates to future research, perhaps the use of select members of the macrofauna could be used as a 'miner's canary' at certain locations in the river.
14. **G-92 structure and C-14 canal** -- several references on pages 32, 33 and 34 are inconsistent with my recollection. The initial installation of the culvert in the mid 1970's was of a structure designed for 50 cfs sustained and 100 cfs maximum. I know of no enlargement that occurred until 1987. Further, references to the C-14 canals construction time and enhancement might be checked with Gale English for accuracy.
15. **Treated wastewater** -- this reference on page 32 would be more accurate if changed to reflect 'AWT' treated wastewater, gallons per day, the presence of a recharge lake employed to discharge the water and a discontinued date of 1986.
16. **Groundwater inflow B** -- very preliminary research on groundwater inflows to the estuary was conducted by the LRD in the 1980's by use of seepage meters. Recognizing the recent criticisms of this methodology, the data may not be useful when considering references such as page 38 or page 68, but it is available if needed.
17. **Reclaimed water** -- the comment on page 44 stating that unused water is disposed might better read 'is stored for later use or disposed of by deep injection well'.
18. **Water quality A** -- the comprehensive monitoring program discussed on pages 45 and 46 is conducted every other month, not twice each month. The addition of a phrase 'and is updated every six months' at the end of the first paragraph on page 46 would be appreciated. As relates to the Florida Water Quality Index, reports updating the index through 2001 are available. A second index employed for estuaries in Florida is the Trophic State Index (TSI). One of the enclosed documents speaks to this index as it applies to the Loxahatchee. Of special note is an observation that the estuary may be phosphorus limited (as relates to trophic state and productivity) and that new discharges to the system should be evaluated for excessive phosphorus. As relates to future research, the continued monitoring of trophic levels and phosphorus is suggested.
19. **Water quality B** -- the enclosed document of dissolved oxygen describes a problem in the upper reaches of the wild and scenic river and targets cause. Given the need to show that MFL induced changes will favorably impact the water quality, the topic of this report may be helpful. Essentially, it shows that C-18 water discharged to the river through the G-92 structure provides an improvement as relates to D.O. Perhaps inclusion of this observation, either on page 68 or in the research section could be beneficial.
20. **Cypress / Salt** -- the sentence 'occasional inundation by slightly saline surface water probably does not result in serious long-term impacts' is too subjective for a technical document of this caliber.
21. **Plants and Animals** -- the reference to diversity on page 51 should qualify the type of organisms identified. For instance, adult insects are not, nor should be, included. This comment also applies to page 61.
22. **Recreation** -- the discussion of facilities on page 55 should mention the present role of the Canoe Outfitters in Riverbend Park.



23. **Other Plans** -- on page 58 and prior pages, a summary of the Loxahatchee river watershed management plan is provided. Perhaps a similar reference to the Wild and Scenic river management plan would be useful.
24. **Water supply** -- this section beginning on page 62 could be improved by a more detailed discussion of agricultural water use.
25. **Water classification** -- there continues to be inconsistency on the extent of the Class II waters in the watershed. Table 14 on page 67 indicates that the whole of the northwest fork is Class II whereas the reference on page 71 is for Class III. This inconsistency should be resolved in favor of the freshwater reach of the northwest fork designated as Class III.
26. **Consumptive uses A** -- the comment on page 68 that the effects of these uses are 'not very large' should be better quantified given the analytical work on the existing data. If the reference to 5cfs on page 107 speaks to the same issue, a rationale for reaching the conclusion is lacking.
27. **River miles** -- Table 15 on page 77 and the graphic on page ?? clarify what has been an undesired variable. Thanks!
28. **Modeling assumptions** -- on page 79, the selection to use a constant when relating discharge fractions from tributaries to the Lainhart dam fails to make use of available data. Specifically, the seasonal fluctuations in the relative contributions as described by McPhearson in his early 1980's work. Additionally, the basis for the constant assumption of 40 cfs from groundwater is not explained.
29. **Mean daily salinity** -- references to this value is made on pages 80, 92, 145 and elsewhere. Given that the raw data on salinity was developed using maximum bottom salinities, an explanation of why and how the conversion was made is needed.
30. **Soil salinity** -- the concentration changes referenced on page 86 appear to be spatial, not temporal, and should be so specified.
31. **Statistical analyses** -- perhaps a review of Appendix D would help resolve my ignorance. As it is, however, I don't know what the paragraph on page 87 means.
32. **Model progression** -- the discussion of models included in the MFL document is not simple to understand. However, the reliance of one model on the results of the prior model appears weak to one not formally trained in modeling. Model 1 converts actual salinity data to simulated salinity data, the new salinity data is extrapolated over time by a second model, then subjected to the Ds/Db model. This ration is then incorporated into a fourth model relating to vegetation (and, I may have missed a model). Perhaps a better explanation of the relationships will provide clarity and confidence.
33. **Literature review A** - A report entitled 'Loxahatchee River Salinity Monitoring Program' (unpublished) was presented to the Loxahatchee River Management Coordinating Council in 1994. This document, certain graphics of which are enclosed, offered the opinion and supporting data that 50 cfs was insufficient to meet stated goals. To the extent that the new flow goals were accepted, the comment on page 96 that 'as late as 1998, the original USGS flow target of 50 cfs ....' Can be questioned.
34. **Literature review B** -- The reference at the top of page 96 slightly misstates the conclusion of the 1997 report. A minimum flow rate of 75 cfs was 'recommended' and seasonal minimum flows and maximum flow range were 'suggested'.
35. **G-92 flow** -- Figure 19 on page 98 is very descriptive of the improved flow capabilities. The major reason for this is less clear however, A more complete explanation of the

culvert enlargement from 100 cfs to 400 cfs is warranted. As an aside, how can the 721 cfs measurement be accurate given the max design?

36. **Consumptive uses B** -- the identification of uses with the potential impact to the river is incomplete. Given that the Loxahatchee slough, in either its current or proposed configuration, is integrally connected with the C-18 canal, then considering impact of groundwater withdraws under the C-18 only is insufficient. Withdraws beneath the slough also have a definite impact on the river.
37. **G-92 Culvert B** -- the reference to additional culverts (plural) on page 128 is questioned and the sentence following on 'operational criteria' needs clarification.
38. **Vegetation** -- this section looks good but I need additional time to evaluate it and review the appendices. One observed inconsistency is noted between statements on the presence of saplings and seedlings near river mile 9.2 (see pages 116 and 135).
39. **65cfs** -- the summary of the NPBCCWMP on pages 152 and 153 includes the statement 'provide supplemental water to maintain up to 65 cfs...' I thought the up to phrase was corrected before the plan was issued. As related elsewhere in the MFL document, the goal of the WMD remains on of 'continue to provide flows of 65 cfs or greater....whenever water is available'.
40. **Water delivery** -- the narrative on page 157 relates to 35 cfs and 65 cfs. For consistency, the title of Table 42 should also list both flow goals.
41. **Figure 34** -- this graphic on page 158 is very descriptive. Good job.
42. **Salinity barrier** -- the paragraph on page 165 should include the effect of the biological community as well as salinity and other water quality issues.
43. **Extreme dry conditions** -- several references in the report, including table 23 on page 97 and the summary on page 140, speak to the droughts of 1980-81 and 1989-90 in terms of full dry season averages. Other references, page 98 and table 24 evaluate shorter time frames within these droughts. The difference in average flow over an extreme two or three month spell and the average flow over the full six month dry season can be significant. Given that sixty days or less of very low flow can likely cause significant harm, placement of a greater emphasis on flows during dry periods of shorter duration is suggested.
44. **Stormwater management** -- the enclosed Stormwater Management Plan was prepared for and accepted by the Management Coordinating Council about three years ago. The document inventories existing drainage systems, identifies problems and develops recommendations including the means to increase the duration of freshwater flows delivered to the river and reducing pollutant loadings. The evaluation of other basins on page 158 may benefit from this document.
45. **SIRWCD improvements** -- The efficiency of delivering supplemental flows to the river will be enhanced with the implementation of new structures within the drainage canals. Perhaps this program could be discussed more completely.
46. **Minimum flow criteria** -- the statement presented in the executive summary and on page 149 needs clarity &/or is incomplete in at least three respects. First, the use of 'mean monthly flows' is debated. How was this time frame established and, given flow variances, how can it be defended. Second, my question of last month is still unanswered. Is the 20-day period cumulative or consecutive? If it is intended to be consecutive, additional criteria will be needed to protect the river. The third matter relates to the



establishment of an absolute floor. Given that the salinity moves upstream within a matter of days, flows of less than 20cfs?? (pick a number) should be disallowed.

47. **Exclusions** -- the staff suggestion that it is not appropriate to apply the exclusion regarding historic functions is extremely subjective and has no basis in fact or support from technical information. To see this statement in the middle (page 72) of a scientific document is concerning.
48. **Water reservations** -- on page 164, the sentence 'the first reservation of existing water for the Loxahatchee River should be made within on year after Governing Board approval' would be more meaningful with two clarifications. What is meant by existing water, is it part of or in addition to the 35 cfs? And, Governing Board approval of what (the MFL) will trigger the reservation process?
49. **Research needs and monitoring** -- as relates to the currently proposed MFL and future MFL work in the freshwater and estuarine portions of the system, research and/or continued monitoring in the following areas is suggested. Submerged aquatic vegetation, macroinvertebrates, nutrients and trophic state and dissolved oxygen in the upper reach of the northwest fork.

## RESOLUTION NO. 02-02

### A RESOLUTION OF THE LOXAHATCHEE RIVER MANAGEMENT COORDINATING COUNCIL URGING DEVELOPMENT OF A RESTORATIVE MFL FOR THE PROTECTION AND ENHANCEMENT OF THE LOXAHATCHEE RIVER SYSTEM

WHEREAS, in 1983 Chapter 83-358 Section 4, Florida Statute (FS) designated portions of the Northwest Fork of the Loxahatchee River (the "River") as a State Wild and Scenic River specifically between River mile 6 and River mile 13.5 (Section 3) and includes the Legislative finding that it "...possesses outstandingly remarkable ecological, fish and wildlife, and recreational values..." "...which should be permanently preserved and enhanced..." (Section 2); and

WHEREAS, Chapter 83-358 Section 3 (8) FS defines the "River area" as "...that portion of the River from River mile 6 to River mile 13.5 together with such abutting uplands as determined in the permanent management plan," "...which may be necessary to maintain the natural and scenic appeal of the River."; and

WHEREAS, the South Florida Water Management District (the "SFWMD") and the Department of Environmental Protection ("DEP") were mandated by Chapter 83-358 Section 5(1) FS to develop a Plan consistent with the National Wild and Scenic Rivers System, and in accordance with Public Law 90-542, Section 10(a) of the Wild and Scenic Rivers Act which states a non-degradation and enhancement policy for all designated River areas; and

WHEREAS, the Loxahatchee Management Coordinating Council (the "Council") was established pursuant to said FS Chapter 83-358 for the purpose of participating in the development of a Loxahatchee River Management Plan (the "Plan") for, and in accordance with the Loxahatchee River Wild and Scenic Designation and Preservation Act; and

WHEREAS, the Council has reviewed the draft Minimum Flow and Level ("MFL") proposal and finds that it does not accomplish the intent of Chapter 83-358 Section 2 stating that, "It is the intention of Legislature to provide for the permanent preservation of the designated segment of the Loxahatchee River"; and

WHEREAS, in accordance with the Plan, the SFWMD adopted December 2002 as the date for establishing a MFL for the Loxahatchee River system, and the members of this Council have concluded that this would not allow time for determination of the minimum flow needed to achieve the objective in the Plan for River enhancement, or the objective stated in the Comprehensive Everglades Restoration Plan for ecosystem restoration; and

WHEREAS, the proposed minimum flow to the River addresses "the remaining floodplain swamp community" up to River mile 9.2, but it is the Council's determination that this is inadequate, and will not protect, maintain, nor restore conditions below River mile 9.2 which existed at the time Chapter 83-358 was adopted, as it has been widely recognized for several decades that the current dry season flows to the Loxahatchee River are insufficient and damaging to the ecology of the River, and

WHEREAS, since the passage of Chapter 83-358 in 1983 more than nineteen years have lapsed without minimum flows being adopted for the River in accordance with the Plan, and in the absence of the development of MFL criteria the River continues to decline, it shall be a priority of both the SFWMD and DEP to develop minimum flow criteria; and

WHEREAS, recognition of this damage has resulted in development of preliminary plans for a series of projects proposed under the US Army Corps of Engineers' ("COE") Critical Project List, the Comprehensive Everglades Restoration Plan, the Northern Palm Beach County Comprehensive Water Management Plan ("NPBCWMP"), and the Lower East Coast Regional Water Supply Plan for increasing dry season deliveries for the River and other parts of the natural system and water supply;

NOW, THEREFORE, BE IT RESOLVED by the Loxahatchee River Management Coordinating Council as follows:

1. The SFWMD should work closely with, and offer all possible assistance to the DEP in their effort to develop a plan for enhancement of the River.
2. If the SFWMD adopts a MFL of 35 cfs for the River in December 2002 as currently proposed, as noted above, such plan only protects the remaining and existing healthy cypress swamp community, and such proposal will not completely recover, nor significantly enhance already stressed areas of the River, and will have a substantial adverse impact upon the resource values in the River area, and that any proposal if adopted shall clearly acknowledge that the adopted MFL is an interim MFL.
3. The SFWMD and the COE should include the enhancement of the River as an objective in the Northern Palm Beach Comprehensive Everglades Restoration Plan ("NPB-CERP") and include as a temporary value in that planning process a MFL of at least 65 cfs (NPBCWMP, p. 5), until a specific number is developed through joint research with the DEP River enhancement planning effort.
4. During the development of the Project Implementation Report (PIR) for the NPB-CERP, the SFWMD and the COE shall ensure the entire River watershed is considered in the planning process including those sub-basins located in Martin County as well as Palm Beach County, as was mandated in Chapter 83-358.

5. The SFWMD and the COE shall ensure that during the development of the PIR for the NPB-CERP, project components are considered for construction in all areas of the watershed that will provide additional water and are sized to be able to meet the River's needs in consideration of, and in coordination with the DEP River enhancement planning effort.

6. The SFWMD, COE and DEP should ensure that as River enhancement objectives are identified, a modified MFL will be adopted that, in conjunction with the environmental water reservation that the Water Resources Development Act of 2000 requires to be developed and included in the NPB-CERP PIR, shall:

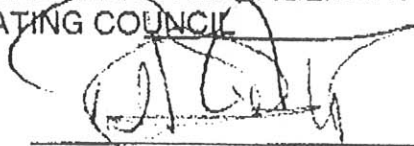
A. reflect seasonal variations, protects non-consumptive uses such as recreation, and fish and wildlife utilization of the Loxahatchee River ecosystem including both freshwater and estuarine portions; and

B. maintain conditions that provide for the propagation of cypress trees and a complete natural forested floodplain understory and animal community, and protects and enhances a healthy estuarine natural community.

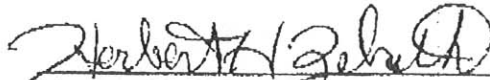
7. In consideration of the above six items, this Council recommends that a coordinated effort shall be undertaken by both the SFWMD and the DEP to adopt a restorative MFL. Both agencies shall agree to and determine the location of a mile marker within the River to which design of allowable dry season salinity intrusion will be acceptable. Such location shall be between mile marker 6 and Kitching Creek, after which a restoration plan shall be prepared in conjunction with other agencies and completed not later than twelve months from adoption of this resolution.

RESOLVED AND ADOPTED this 29<sup>th</sup> day of July 2002.

LOXAHATCHEE RIVER MANAGEMENT  
COORDINATING COUNCIL



Richard Dent, Chairman



Herbert H. Zebuth, Secretary

Attest:   
Kathy LaMartina, SFWMD Staff

**Received from Rim Bishop on August 5, 2002**

John,

Here are some preliminary comments on Exhibit O. I have handwritten markups as well that I will mail you this week.

For emphasis, I note that the demand figures noted for Seacoast are simply wrong, consistently higher by far than the actual records on file with SFWMD indicate. We have attempted to correct them where we can, and we are anxious to assist SFWMD staff in finding ways to incorporate our input.

Thank you so much for the opportunity to participate in this most important process. We deeply appreciate your responsiveness to date, and we look forward to reviewing a subsequent draft. Please do not hesitate to call if any of the comments are unclear.

**Received from Rim Bishop on August 5, 2002**

Seacoast Utility Authority comments to draft Exhibit "O" to the draft *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*

## **OVERVIEW**

Appendix O gives no indication of having accounted for some 15 million gallons per day of reclaimed water that is currently applied within the watershed during the driest of weather, nor the fact that this volume is likely to double within the next 15 years. The point about how dramatically water consumption will increase is clearly made however. Our recommendation would be to adjust both the editorial and numerical content of the report accordingly. SFWMD has all the data, but in case it has been misplaced, Seacoast will resubmit its figures if necessary. To do this, one might start with figures currently being compiled for the SFWMD Northern Palm Beach County Reclaimed Water Master Plan.

The author should make certain that all references and figures in this appendix are confined to the Loxahatchee River watershed and to surface water or surficial aquifer supplies. Including demands that will be met from the Floridan aquifer or overstating surficial aquifer demands, if that is what has been done, is misleading. For example, the Hood Road wellfield is the only Seacoast water supply source located within the area identified as the watershed, but some of the reported flow figures appear to include water from other Seacoast wellfields. Conversely, the report appears to identify the West Palm Beach Water Catchment area as lying within the watershed; are the City's water supply demands included as well? If not, this inconsistency should be remedied.

SFWMD taxpayers can take heart in the agency's very conservative approach to water resource planning. This draft continues the tradition of inadvertently (but consistently) overstating Seacoast's consumptive use demands. Be assured that when the day comes that SFWMD errs on the low side, we will offer corrections with equal enthusiasm and vigor. We hope that you will review and incorporate the figures that we have revised, and we are prepared to offer supporting documentation should you require it.

Finally, we renew our objection to including any lands east of Military Trail and south of Indiantown Road within the Loxahatchee River watershed. Except as confined by the law of conservation of matter and the fact that water molecules found in both areas contain both hydrogen and oxygen (which characteristics similarly apply to the polar ice caps), there is no connection. We have explained this perspective earlier and are anxious to meet with SFWMD staff if after further consideration, they disagree.

## **PAGE O-1**

First Paragraph – Is the West Palm Beach Water Catchment area in the defined watershed? If so, the City’s water demands should be included.

There should be a comma after the word “Watershed” in line three.

Second Paragraph – The 1995 demands outlined may have been LEC planning figures, but they are wrong. In 1995, the Hood Road wellfield withdrawal was 3,536 MG, not the 5,274 MG you show (see SFWMD pumpage reports). We fail to see the relevance of converting these figures to acre-feet.

It is the Village of Tequesta, not the Town of Tequesta.

## **Page O-2**

Summary of Data ...

First paragraph – Based on actual experience through multiple droughts, there is little evidence to support the statement that this area is any more susceptible to salt water intrusion than any other coastal area, including those with a connection to the regional conveyance system.

Second paragraph – One might get the impression that public water supply demand supplied from the watershed was 82.2 MGD in 1995 and will be 128.6 MGD in 2020. Is that annual average day? All from the surficial aquifer system? More definition and support for these figures is needed – we can’t tie back to them based on what we know about Seacoast’s needs and the needs of its neighbors.

## **Page O-3**

Figure O-1 – Because Seacoast’s flow has been incorrectly identified, this table will need to be recalculated. We do not see the need for this analysis at all.

Last paragraph – Again, the only Seacoast wellfield located within your definition of the watershed is the Hood Road wellfield. In 1999, that wellfield pumped 12,683 acre-feet (if you must use that unit of measure), not 21,631 as you suggest.

While I know that 1995 planning figures played a significant role in the Lower East Coast process, more current actual figures should be used. Otherwise, the reader might assume that measures implemented within the past ten years (reclaimed water proliferation, water conservation measures, etc.) will have no impact.

## **Page O-4**

Table O-4 – Of what value is the column entitled “1998 Annual Water Use”. If this is just a typo and should be 1999 figures, then please correct them as noted above.

First paragraph – Should the word “Basin” be capitalized?

Figure O-2 – The value of this table is questionable at best, as far as we can tell.

Second paragraph – There should be a comma after the word “Summary”.

Also, we really do not understand the relevance of this analysis, particularly this paragraph.

**Page O-5** – There is an extra “s” at the end of the word “changes”.

The regional reclaimed water system to which you refer is not, as far as we know, being developed – it is being studied. Its feasibility is seriously in question, and the report should more accurately reflect that status. The report should likewise note the successes of both Loxahatchee River District’s and Seacoast’s reclaimed water systems, including tables showing how much water these programs return to the resource each year (in MGY for sure, and in acre-feet if you must).

Table O-5 – The hydraulic connection of many, many of the listed properties to the Loxahatchee watershed simply does not exist.

Table O-1 – It is virtually impossible for the casual reader (e.g., Seacoast’s Executive Director) to determine the relevance of this table. Respectfully, it seems to add extraneous data and thereby promote confusion.



# APPENDIX O -- PUBLIC AND AGRICULTURAL WATER SUPPLY

## CONTENTS

|                                                                       |      |
|-----------------------------------------------------------------------|------|
| Public Water Supply Demands.....                                      | O-1  |
| Agricultural Water Supply Demands.....                                | O-2  |
| Summary of Data from the SFWMD Water Use Permit Database.....         | O-2  |
| Table O-1. WATER SUPPLY DEMANDS WITHIN THE LOXAHATCHEE WATERSHED..... | O-7  |
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| Literature Cited.....                                                 | O-10 |

### Public Water Supply Demands

Water for urban and agricultural uses in the Loxahatchee watershed is supplied from both groundwater and surface water systems. Non-environmental surface water demands within the basin are primarily public water supply, commercial and industrial with some agricultural uses. The commercial and industrial demands vary greatly by type of business. In the Loxahatchee Watershed, commercial and industrial demands are less than one percent (1%) of the overall water demands. Because the demand is relatively small and difficult to generalize, an average demand was not calculated for this use category and emphasis was placed on estimation of agricultural and urban uses.

Total public water supply demands for the major utilities within this area for 1995 were estimated for the Lower East Coast Regional Water Supply Plan (LECRWSP -- SFWMD, 2000e) and are summarized in **Table O-1**. Total 1995 demands were estimated as 28,384 acre feet/year. Largest users within the watershed consisted of Seacoast Utilities (16,185 ac-ft/year), Town of Jupiter (10,629 ac-ft/year) and the Town of Tequesta. Together these three utilities represent more than 99% of the total urban water supply demand within the watershed.

Because public water supply withdrawals were an issue of concern in this watershed, additional analyses were undertaken by the SFWMD to update the analysis used in the LECRWSP. Recent monitoring and reporting data were analyzed as well as information provided in applications for permit renewals. This analysis and the results are described in detail in **Chapters 4 and 5**.

Table O-1. Urban water supply demands in the Loxahatchee Basin

| Permittee          | Permit Number | 1995 Demands         |                |
|--------------------|---------------|----------------------|----------------|
|                    |               | Million Gallons/Year | Acre-feet/year |
| Seacoast (Wood Rd) | 50-00365-W    | 3,536                | 5,274          |
| Town of Jupiter    | 50-00010-W    | 3,464                | 10,629         |
| Tequesta           | 50-00046-W    | 515                  | 1,579          |
| PB Park Commerce   | 50-01528-W    | 4                    | 11             |
| <b>Total</b>       |               | <b>9,253</b>         | <b>28,384</b>  |

Source: SFWMD Unpublished Consumptive Use Permit Data

### <sup>Uses</sup> Agricultural Water Supply Demands

A different procedure was adopted for estimating agricultural use in the Loxahatchee watershed because measured withdrawal data were not available. The procedure used was to estimate current water use based on Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) water demand modeling (Smajstrla 1990, Moraga et al. 1995), and current agricultural acreage (FDEP 1998). Agricultural water use depends on the crops that are grown in the watershed and on how those crops are managed and irrigated. An important factor in accurately estimating agricultural water use is determining the location and acreage of crops. Citrus and small vegetables are crops found in the basin. The supplemental irrigation requirements for 1995 are found in Table O-2.

<sup>Year</sup>  
Table O-2. Agricultural Demands for the Sub-Basins in the Loxahatchee River Basin.

| Subbasin No. | Subbasin Name                  | 1-in-2 Agriculture Demands (ac-ft/yr) | 1-in-10 Agriculture Demands (ac-ft/yr) |
|--------------|--------------------------------|---------------------------------------|----------------------------------------|
| 1            | Jonathan Dickinson/ Hobe Sound | 3,032                                 | 5,123                                  |
| 2            | Coastal                        | 558                                   | 816                                    |
| 3            | The Estuary                    | 643                                   | 939                                    |
| 4            | C-18/Corbett                   | 6,201                                 | 10,478                                 |
| 5            | Cypress/PalMar                 | 4,335                                 | 7,324                                  |
| 6            | The Groves                     | 7,712                                 | 13,030                                 |
| 7            | Wild & Scenic/Jupiter Farms    | 792                                   | 1,158                                  |
|              | <b>Total</b>                   | <b>23,273</b>                         | <b>38,868</b>                          |

Sources: Smajstrla 1990, Moraga et al. 1995, FDEP 1998

### Summary of Data from the SFWMD Water Use Permit Database

Water for urban supply, golf courses, landscape irrigation, and agricultural uses is supplied from three sources within the Loxahatchee watershed: surface water systems, the Surficial Aquifer System (SAS) and the Floridan aquifer. Use of the SAS, the traditional source for public water supply, is limited within most of the watershed due to increased potential for impacts on local wetland systems, the Loxahatchee River, and saltwater intrusion. In addition, the Jupiter/Tequesta area is not currently connected to the Central and Southern Florida Project, which provides a backup source of water for the majority of other Lower East Coast communities. For this reason, this watershed is more susceptible to the effects of drought and salt water intrusion during dry periods than other South Florida coastal areas. As a result, several municipalities (Jupiter and Tequesta) have gone to reverse osmosis (RO), utilizing the Floridan aquifer as their primary water supply source.

Not supported by the record

Northern Palm Beach County is expected to experience significant growth between now and 2020, primarily in coastal areas. In the Northern Palm Beach County planning area, public water supply demands are projected to increase by 63 percent, from 82.2 million gallons per day (MGD) in 1995 to 128.6 MGD in 2020. In contrast, agricultural demands (about 13 MGD) are projected to decrease by about 12 percent by 2020 (SFWMD 2002). No additional agricultural development is predicted to occur – in

Where did these figures come from?

fact some existing agricultural lands located near the headwaters of the Loxahatchee River (Loxahatchee Slough) may be displaced by future urban development (e.g., golf courses and residential units).

In this study, public water supply, landscape irrigation and agricultural water demands within the basin were estimated based on: (a) the annual allocation of each permit holder obtained from District records and (b) the average daily demand values used in the Northern Palm Beach County Comprehensive Water Management Plan hydrologic model (MODFLOW). Permitted withdrawals by use category for 1999 are summarized in **Figure O-1** and **Table O-3**. This is the same list of permitted users within the watershed that was used in the well package of the northern Palm Beach County model simulation.

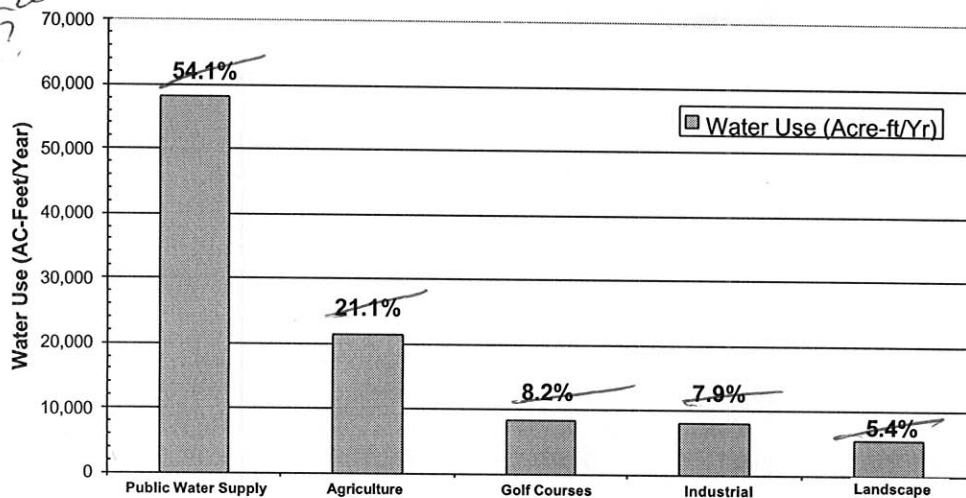


Figure O-1. Water Use in the Loxahatchee River Watershed -1999

Table O-3. Summary of Water Uses within the Loxahatchee Watershed for 1999.

| Water Use Type     | Million Gallon/Year | Acre-Feet/Year     |
|--------------------|---------------------|--------------------|
| Urban Water Supply | <del>18,862</del>   | <del>58,081</del>  |
| Agriculture        | 6,943               | 21,306             |
| Golf Courses       | 2,705               | 8,303              |
| Industrial         | 2,684               | 8,038              |
| Landscape          | 1,767               | 5,422              |
| Total              | <del>32,961</del>   | <del>101,150</del> |

See Table C-1, Appendix C for summary of water use by individual permit

Overall, total urban water supply demands compiled for 1999 were ~~58,081~~ acre feet/year (**Table O-3**). The largest users within the watershed consisted of the Seacoast Utilities-Hood Road wellfield (21,631 acre-feet/year), Town of Jupiter (30,825 acre-feet/year), and the Village of Tequesta (5,427 acre-feet/year). Together these utilities represent 53.8% of the total water supply demand within the watershed (**Table O-4**).

12,683

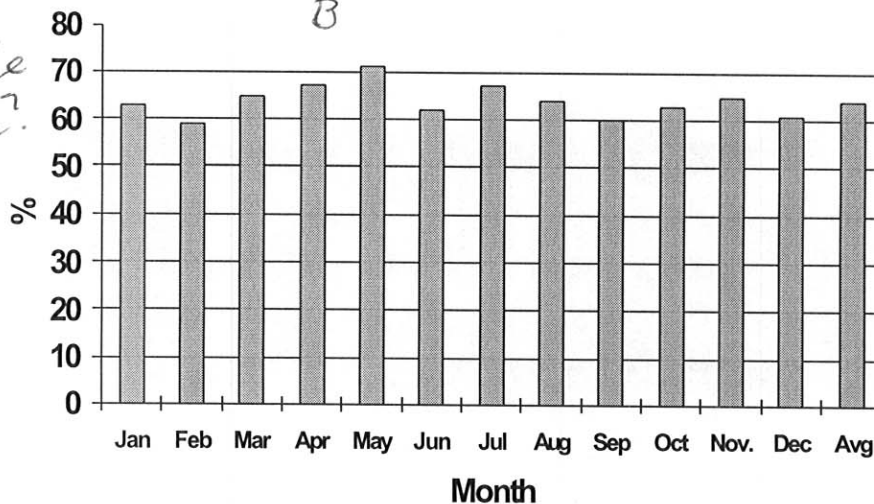
*See corrected Seacoast figure, recalc total.*

**Table O-4. Summary of Urban Water Supply Demands within the Loxahatchee Watershed (MGY = Million Gallons/Year)**

| Permittee                        | Permit Number | 1998 Annual Water Use (MGY) | 2000 Annual Water Use (MGY) | 1999 Allocations |              |
|----------------------------------|---------------|-----------------------------|-----------------------------|------------------|--------------|
|                                  |               |                             |                             | MGY              | Acre-feet/yr |
| Town of Jupiter (PWS)            | 50-00010-W    | 3442                        | 3214                        | 10,045           | 30,825*      |
| Village of Tequesta (PWS)        | 50-00046-W    | 589                         | 446                         | 1,768            | 5,427*       |
| Seacoast Utility- Hood Rd. (PWS) | 50-00365-W    | 4604                        | 4729                        | 7,049            | 21,631       |
| Palm Beach Park of Commerce      | 50-01528-W    | N/A                         | N/A                         | 65               | 198          |
| Total                            |               |                             |                             | 18,927           | 58,081       |

\* Both the Town of Jupiter and the Village of Tequesta obtain a majority of their water supply from the Floridan Aquifer

Permitted allocation values were also compared to actual pumpage values submitted to the District by the permit holder to get a comparison of the amount of water actually used during normal operations and what is used during peak demand periods. **Figure O-2** provides a monthly summary of the three identified Public Water Supply permittees within the Loxahatchee Basin comparing actual data as a percentage of permit allocations during the period from 1988 to 1999.



**Figure O-2. Total Monthly Water Use by Jupiter, Seacoast (Hood Road Wellfield) and Tequesta expressed as a percentage of the total monthly allocation (996 million gallons per month) for these three Utilities.**

In summary, the daily averages from the permit were compiled for each month and compared to values submitted from each utility, indicating that the actual pumpage values were, on average, between 60 and 70% of the allocation amount.

Use of traditional sources (surface water and the Surficial Aquifer System) for public water supply and landscape irrigation can be expanded for the Loxahatchee watershed with completion of the proposed water resource development projects outlined within the Lower East Coast Regional Water Supply Plan (SFWMD, 2000) and the Northern Palm Beach County Comprehensive Water Supply Plan (SFWMD, 2002) and more efficient use of regional and local water supplies. However, many of the projects

will not be completed within the next five years. Therefore the SFWMD is placing more emphasis on implementation of a comprehensive water conservation program and the use of alternative sources such as the Floridan Aquifer System and reclaimed water, to help meet water needs during this period. Some public water utilities and golf courses have supplemented their water demand with the use of the Floridan Aquifer System. Development of a regional irrigation water distribution system using reclaimed water is also underway with the users listed in **Table O-5** already on line. Continued development of such alternative sources, increased emphasis on water conservation, along with some changes to wellfield configurations and operations will help meet the 1-in-10 year level of certainty and reduce impacts to the Loxahatchee River and estuary within the next five years.

This is HIGHLY misleading.

- ① A "regional" system is not being "developed," it is being studied.
- ② The users listed, those that currently receive reclaimed water, are connected to Lox River District's or Seacoast's system, not a "regional system."
- ③ The failure to recognize existing successful reclaimed operations, both editorially and in evaluating regional resource impacts, is entirely inappropriate.

Table O-5 WATER SUPPLY DEMANDS WITHIN THE LOXAHATCHEE WATERSHED

| Martin County |                                               |                          | 1996 Annual Water Use | 1998 Annual Water Use | 2000 Annual Water Use | 1999 Allocations |          |
|---------------|-----------------------------------------------|--------------------------|-----------------------|-----------------------|-----------------------|------------------|----------|
| Land Use      | Permittee                                     | Permit Number            | MGY                   | MGY                   | MGY                   | MGY              | Ac-ft/Yr |
| AGR           | SOUTH FLORIDA GRASSING                        | 43-00021-W               | N/A                   | N/A                   | N/A                   | 289              | 887      |
|               | JENKINS LANDSCAPING                           | 43-00045-W               | N/A                   | N/A                   | N/A                   | 67               | 206      |
|               | HOBE-ST LUCIE CONSERVANCY DISTRICT            | 43-00057-W               | N/A                   | 3072                  | 5138                  | 4460             | 13687    |
|               | SUNRISE-GULFSTREAM CITRUS GROVES              | 43-00120-W               | N/A                   | N/A                   | N/A                   | 545              | 1673     |
|               | SUNSHINE STATE CARNATION                      | 43-00628-W               | N/A                   | N/A                   | N/A                   | 12               | 37       |
|               | SUN LAND CO                                   | 43-00839-W               | 0                     | 0                     | 0                     | 974              | 2988     |
|               | SOUTH FLORIDA GRASSING INC                    | 43-00893-W               | N/A                   | N/A                   | N/A                   | 410              | 1257     |
| Sub Total     |                                               |                          |                       |                       |                       | 6757             | 20736    |
| GOL           | JUPITER HILLS CLUB                            | 43-00054-W <sup>WR</sup> | N/A                   | 66                    | 234                   | 58               | 177      |
| *             | MARINER SANDS COUNTRY CLUB                    | 43-00064-W <sup>WR</sup> | 201                   | 586                   | 618                   | 298              | 914      |
|               | CYPRESS LINKS GOLF COURSE                     | 43-00138-W               | N/A                   | N/A                   | N/A                   | 149              | 457      |
|               | TURTLE CREEK CLUB                             | 43-00140-W <sup>WR</sup> | N/A                   | N/A                   | ?                     | 20               | 61       |
|               | EAGLEWOOD                                     | 43-00220-W <sup>WR</sup> | 56                    | N/A                   | N/A                   | 32               | 98       |
|               | JONATHANS LANDING GOLF CLUB, INC.             | 43-00221-W <sup>WR</sup> | 104                   | 91                    | N/A                   | 237              | 728      |
| *             | JUPITER ISLAND GOLF COURSE                    | 43-00273-W <sup>11</sup> | 92                    | 138                   | 309                   | 16               | 50       |
| *             | THE MEDALIST                                  | 43-00800-W <sup>WR</sup> | ?                     | ?                     | N/A                   | 46               | 141      |
| Sub Total     |                                               |                          |                       |                       |                       | 855              | 2625     |
| LAN           | LITTLE CLUB CONDOMINIUM ASSOCIATION, INC. THE | 43-00202-W               | N/A                   | N/A                   | N/A                   | 24               | 75       |
| *             | LOBLOLLY PINES DEVELOPMENT COMPANY            | 43-00382-W <sup>WR</sup> | N/A                   | 194                   | 184                   | 106              | 325      |
|               | PRESERVE THE                                  | 43-00435-W               | N/A                   | N/A                   | N/A                   | 61               | 188      |
| *             | MARINERS SANDS LANDSCAPING                    | 43-00441-W               | N/A                   | 3.7                   | 4.9                   | 69               | 213      |
|               | DOUBLE TREE COUNTRY CLUB                      | 43-00632-W               | N/A                   | N/A                   | N/A                   | 154              | 473      |
|               | JUPITER HILLS HOMEOWNERS ASSOCIATION          | 43-00722-W               | N/A                   | N/A                   | 64                    | 86               | 265      |
|               | RIVERSIDE MEMORIAL PARK                       | 43-00885-W               | N/A                   | 0                     | N/A                   | 23               | 70       |
| Sub Total     |                                               |                          |                       |                       |                       | 524              | 1609     |

Why are these in the watershed?  
 If these are included, why not Jupiter  
 Island and Mariner Sands?

DRAFT

O-6

07/12/02



Table O-1. WATER SUPPLY DEMANDS WITHIN THE LOXAHATCHEE WATERSHED

| Palm Beach County |                                              |                         | 1996<br>Annual<br>Water<br>Use | 1998<br>Annual<br>Water<br>Use | 2000<br>Annual<br>Water<br>Use | 1999 Allocations |          |
|-------------------|----------------------------------------------|-------------------------|--------------------------------|--------------------------------|--------------------------------|------------------|----------|
| Land Use          | Permittee                                    | Permit Number           | MGY                            | MGY                            | MGY                            | MGY              | Ac-ft/Yr |
| AGR               | PARCEL 19.01                                 | 50-00547-W              | N/A                            | N/A                            | N/A                            | 167              | 511      |
|                   | C-18 BASIN PROPERTY/MECCA FARMS              | 50-01626-W              | N/A                            | N/A                            | N/A                            | 19               | 59       |
| Sub Total         |                                              |                         |                                |                                |                                | 186              | 570      |
| GOL               | TEQUESTA COUNTRY CLUB                        | 50-00223-W <sup>W</sup> | N/A                            | N/A                            | N/A                            | 9                | 27       |
|                   | SEMINOLE GOLF CLUB                           | 50-00349-W              | 80                             | 72                             | 76                             | 80               | 245      |
|                   | PGA NATIONAL                                 | 50-00617-W              | 491                            | 281                            | 857                            | 549              | 1685     |
|                   | BALLENISLES CC OF JDM                        | 50-00852-W <sup>W</sup> | 413                            | 732                            | 1344                           | 171              | 524      |
|                   | EASTPOINTE COUNTRY CLUB INC                  | 50-00941-W <sup>W</sup> | N/A                            | 180                            | 162                            | 60               | 183      |
|                   | STONEWAL ESTATES GOLF COURSE                 | 50-01110-W              | N/A                            | N/A                            | 133                            | 114              | 349      |
|                   | OLD MARSH GOLF CLUB (UNIT 21)                | 50-01443-W              | 130                            | 138                            | 171                            | 128              | 392      |
|                   | IRONHORSE LAKE WELLS                         | 50-01906-W              | ?                              | ?                              | ?                              | 160              | 492      |
|                   | INDIAN CREEK GOLF CLUB                       | 50-02053-W <sup>W</sup> | N/A                            | 80                             | N/A                            | 15               | 46       |
|                   | IBIS GOLF & COUNTRY CLUB                     | 50-02120-W              | N/A                            | N/A                            | N/A                            | 397              | 1219     |
|                   | PUBLIC GOLF CORP. CITY OF PALM BEACH GARDENS | 50-02319-W              | N/A                            | N/A                            | N/A                            | 40               | 123      |
|                   | GOLF AND RACQUET CLUB AT EASTPOINTE          | 50-02831-W              | N/A                            | 180                            | 162                            | 44               | 135      |
|                   | JUPITER DUNES                                | 50-03079-W              | N/A                            | 46                             | N/A                            | 39               | 119      |
|                   | THE BEAR'S CLUB                              | 50-04391-W <sup>W</sup> | N/A                            | N/A                            | N/A                            | 45               | 139      |
| Sub Total         |                                              |                         |                                |                                |                                | 1850             | 5678     |
| IND               | WASTEWATER TREATMENT PLANT                   | 50-00126-W              | 0                              | 1.5                            | 1.3                            | 11               | 33       |
|                   | TOWN OF JUPITER RECHARGE SYSTEM              | 50-01584-W              | 61                             | 2.1                            | 11                             | 0                | 0        |
|                   | PRATT & WHITNEY PUMP ADDITION                | 50-01663-W              | N/A                            | N/A                            | 2250                           | 2466             | 7568     |
|                   | NORTH COUNTY AQUATIC COMPLEX                 | 50-02869-W              | N/A                            | N/A                            | N/A                            | 38               | 116      |
|                   | MOBIL OIL STATION 02-F2W                     | 50-02995-W              | N/A                            | 11                             | 9.5                            | 12               | 36       |
|                   | TRI GAS INC AIR SEPARATION PLANT             | 50-03722-W              | N/A                            | 37                             | 34                             | 93               | 285      |
| Sub Total         |                                              |                         |                                |                                |                                | 2619             | 8038     |

Table O-1. WATER SUPPLY DEMANDS WITHIN THE LOXAHATCHEE WATERSHED

| Palm Beach County |                                           |                          | 1996<br>Annual<br>Water<br>Use | 1998<br>Annual<br>Water<br>Use | 2000<br>Annual<br>Water<br>Use | 1999 Allocations |          |
|-------------------|-------------------------------------------|--------------------------|--------------------------------|--------------------------------|--------------------------------|------------------|----------|
| Land Use          | Permittee                                 | Permit Number            | MGY                            | MGY                            | MGY                            | MGY              | Ac-ft/Yr |
| LAN               | FRENCHMAN'S CREEK GOLF COURSE             | 50-00091-W               | N/A                            | N/A                            | N/A                            | 87               | 267      |
|                   | JONATHAN'S LANDING                        | 50-00237-W               | 208                            | 211                            | 285                            | 319              | 979      |
|                   | FPL JUNO BEACH OFFICE BUILDING            | 50-00742-W               | N/A                            | N/A                            | N/A                            | 15               | 46       |
|                   | SEA OATS OF JUNO BEACH                    | 50-01131-W               | N/A                            | N/A                            | N/A                            | 16               | 48       |
|                   | OCEANSIDE TERRACE                         | 50-01204-W               | N/A                            | N/A                            | N/A                            | 2                | 6        |
|                   | RIDGE AT THE BLUFFS, H.O.A.               | 50-01282-W               | 88                             | 104                            | 73                             | 52               | 158      |
|                   | RIVER THE                                 | 50-01373-W               | N/A                            | N/A                            | N/A                            | 22               | 66       |
|                   | JUPITER BAY                               | 50-01391-W               | N/A                            | 4.24                           | N/A                            | 8                | 26       |
|                   | VILLAS OF OCEAN DUNES HOA                 | 50-01392-W               | N/A                            | N/A                            | N/A                            | 18               | 56       |
|                   | CRYSTAL POINTE                            | 50-01442-W               | N/A                            | N/A                            | N/A                            | 14               | 44       |
|                   | CROSSWINDS JUPITER SOUTH                  | 50-01484-W               | N/A                            | N/A                            | N/A                            | 1                | 4        |
|                   | SHORES THE                                | 50-01485-W               | N/A                            | N/A                            | N/A                            | 0                | 0        |
|                   | NORTHPOINT CORPORATE PARK                 | 50-01490-W               | N/A                            | N/A                            | N/A                            | 34               | 104      |
|                   | PALM BEACH PARK OF COMMERCE               | 50-01529-W               | N/A                            | N/A                            | N/A                            | 110              | 339      |
|                   | ADMIRAL'S COVE AND ADMIRAL'S COVE WEST    | 50-01552-W               | N/A                            | 101                            | N/A                            | 132              | 405      |
|                   | INDIAN CREEK                              | 50-01557-W               | 18                             | N/A                            | 24                             | 63               | 193      |
|                   | PRATT & WHITNEY - IRRIGATION WATER SUPPLY | 50-01664-W               | N/A                            | N/A                            | N/A                            | 38               | 116      |
|                   | HAMPTON'S AT MAPLEWOOD THE                | 50-01702-W               | N/A                            | N/A                            | N/A                            | 50               | 152      |
|                   | MARQUETTE ELECTRONICS                     | 50-01842-W               | N/A                            | N/A                            | N/A                            | 5                | 16       |
|                   | HIGH SCHOOL "GGG"                         | 50-01955-W               | N/A                            | N/A                            | N/A                            | 30               | 93       |
|                   | PALM BEACH MIDDLE SCHOOL A-A              | 50-02267-W               | N/A                            | N/A                            | N/A                            | 21               | 66       |
|                   | BALLENISLES DEVELOPMENT                   | 50-02370-W               | N/A                            | N/A                            | 118                            | 70               | 215      |
|                   | JUPITER PLANTATION                        | 50-02871-W               | N/A                            | N/A                            | N/A                            | 15               | 47       |
|                   | EASTLAKES PROPERTY OWNERS ASSOCIATION     | 50-03281-W               | 47                             | 29                             | N/A                            | 40               | 124      |
|                   | EASTPOINTE PROPERTY OWNERS ASSOCIATION    | 50-03282-W <sup>WR</sup> | 72                             | 74                             | 90                             | 70               | 215      |
|                   | THE SANCTUARY & FLAMINGO ROAD             | 50-03401-W               | N/A                            | N/A                            | N/A                            | 9                | 28       |
| Sub Total         |                                           |                          |                                |                                |                                | 1243             | 3813     |

DRAFT

O-8

07/12/02



**RESOLUTION NO. 67-01/02**

**A RESOLUTION OF THE VILLAGE COUNCIL OF THE VILLAGE OF TEQUESTA, PALM BEACH COUNTY, FLORIDA, OPPOSING A PROPOSED RULE BY THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT IMPLEMENTING A MINIMUM FLOW LEVEL OF 35 CFS FOR THE LOXAHATCHEE RIVER IN THE ABSENCE OF INCLUSION OF SEASONAL FLOW VARIATIONS, AND REQUESTING ADDITIONAL STEPS BE TAKEN TO ASSURE THAT RULES AFFECTING FLOWS TO THE LOXAHATCHEE RIVER INCLUDE SEASONAL FLOWS IN EXCESS OF 35 CFS PRIOR TO THE ADOPTION OF MINIMUM FLOW.**

**Whereas,** South Florida Water Management District (SFWMD, the "District") is proposing to establish a Rule to establish Minimum Flow Level of 35 cfs (cubic feet per second) for the Loxahatchee River (the "River"); and

**Whereas,** a minimum flow of 35 cfs will only address minimum flows, in the event of drought conditions and does not address, nor assure season high level flows in excess of said amount continuing to flow to the River; and

**Whereas,** the River has historically received flows in excess of 35 cfs, and is dependent upon seasonal flows in excess of such amount to remain viable, healthy, and productive; and

**Whereas,** the River is one of the most valuable resources to the Village, enhancing our recreational lifestyle, our property values, and our sense of environmental awareness; and

**Whereas,** the SFWMD is failing to address Florida Statutes (FS) 373.042, which mandates the District to use best available information, inclusive of a seasonal variation, if appropriate, to the detriment of the River,

**Now, Therefore it is hereby Resolved,** that the Village of Tequesta opposes the implementation of said proposed Rule implementing a minimum flow level of 35 cfs, in the absence of inclusion of seasonal flow variations, and

**Be it Further Resolved,** that the Village hereby requests that additional steps be taken to assure that the Rules affecting flows to the River include seasonal flows in excess of 35 cfs prior to the adoption of minimum flow levels.

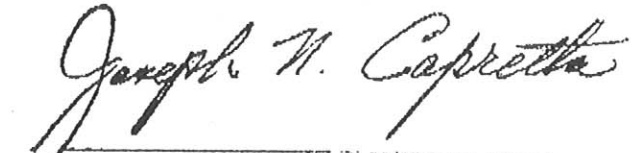
**THE FOREGOING RESOLUTION WAS OFFERED** by Councilmember von Frank, who moved its adoption. The motion was seconded by Councilmember Resnik, and upon being put to vote, the vote was as follows:

**FOR ADOPTION**

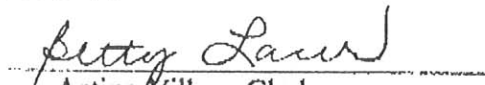
**AGAINST ADOPTION**

**Joseph N. Capretta  
Russell J. von Frank  
Edward D. Resnik**

**The Vice Mayor** thereupon declared the Resolution duly passed and adopted this 8th day of August, 2002.

  
\_\_\_\_\_  
Vice Mayor Joseph N. Capretta

**ATTEST**

  
\_\_\_\_\_  
Acting Village Clerk  
Betty Laur

**Loxahatchee River Management Coordinating Council**  
**July 29, 2002 Meeting**  
**Council Member Attendance and Voting in Support of Resolution 02-02**

| <u>Member</u>             | <u>Affiliation</u>                  |
|---------------------------|-------------------------------------|
| Linda McCarthy            | Florida DACS                        |
| David Clark               | City of Palm Bch. Gardens           |
| David Brown               | Town of Jupiter                     |
| Rick Dent                 | Lox. River Env. Control Dist.       |
| Gale English              | So. Indian River WCD                |
| Geraldine Genco           | Village of Tequesta                 |
| Janet Gettig              | Martin County Conservation Rep.     |
| Anthony Gravett           | Landowner Representative            |
| Tom Howard                | Jupiter Inlet District              |
| Marge Ketter              | Florida DEP at-large                |
| Richard Brust             | Florida Fish & Wildlife Con. Comm.  |
| Peter Merritt             | Treasure Coast Reg. Planning Counc. |
| Jim Ostrander             | River User Group                    |
| Commissioner Karen Marcus | Palm Beach County                   |
| Herb Zebuth               | Florida DEP                         |

**Subject: Minimum Flows and Levels for the Loxahatchee River & Estuary**

**Date:** Thu, 22 Aug 2002 06:05:41 -0700 (PDT)

**From:** Lloyd Brumfield <lloyd4@yahoo.com>

**To:** cmccart@sfwmd.gov

TO: Cathy McCarthy---South Florida Water Management  
District--SFWMD--Reply by 8-23-02

For many months, I have attended many meetings at the SFWMD, and other places, regarding the Loxahatchee River, especially the North Fork in Martin County, and the rapid degradation of the River. Also, it is very easily to come to the conclusion that all agencies, including the SFWMD, have intentionally neglected the Loxahatchee.

Dozens of conversations have been held with technical experts, which I am not, in all of the agencies and those who are not connected with the agencies.

The plan issued July 15, 2002 MINIMUM FLOWS AND LEVELS FOR THE LOXAHATCHEE RIVER & ESTUARY seems to be again lacking of care for the Loxahatchee River.

There are many points in the plan that could be mentioned, however, the number one is the inadequate 35 cfs MFL planned for the Loxahatchee River.

I have reviewed several documents regarding CERP (Comprehensive Everglades Review Program) and the Loxahatchee scarcely is mentioned in some, and not at all in some.

It is my sincere hope that the SFWMD, the Corps, and the Florida DEP get serious about attending to what was the first WILD AND SCENIC RIVER designation in Florida.

There is an item that I find difficult to reconcile. When the Loxahatchee was designated the Wild and Scenic River, a coordinating council was established and has met continuously since 1985. Yet, the River has drastically degraded since that date.

=====

A recent point really disturbs me. I am told that the item on the MFL of the Loxahatchee is on the agenda on September 11 in which the SFWMD Governing Board is meeting in Ft. Myers.

TELL ME IT AIN'T SO.

Sincerely,

Lloyd Brumfield, 11225 SW Meadowlark Circle, Stuart,  
FL 34997-2730--Phone 772-286-4326---Fax 772-286-3244

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# TOWN OF JUPITER

---

UTILITIES  
PO BOX 8900  
JUPITER FL 33468-8900

August 14, 2002

Matthew Morrison, Director  
Water Supply Department Director  
South Florida Water Management District  
3301 Gun Club Road, B-1 Building  
West Palm Beach, Florida 33406-3089

Re: July 15, 2002 Draft to Loxahatchee River MFL Document

Dear Matt:

We have reviewed the July 15, 2002 Draft to the Loxahatchee River Minimum Flow and Levels (MFL) Document and offer the following comments for your review and action:

1. General: We are supportive of the establishment of the 35 cfs minimum flow to the Northwest Fork of the Loxahatchee as a positive first step in protecting the NW Fork from further impacts due to upstream propagation of saline water.
2. Effects of Consumptive Uses: The document fails to effectively provide evidence of the effects of consumptive uses on the surface and ground water flows to the Loxahatchee Slough and the Northwest Fork of the river. Appendix I to the document has yet to be included which apparently was to serve as supporting documentation. Generally speaking, the conclusions drawn within the text related to the effects of consumptive uses are presently unsubstantiated.
3. Consumptive Use Provisions/MFL: Given the vast financial and technical investment made by Jupiter residents in the use of alternative water supplies in order to protect fresh water flows to the river, strong objection would be offered in response to any action leading to the reduction in existing or proposed consumptive uses within the Town. Regulatory strategies to be adopted by rule, should be crafted to promote the advancement of alternative water supply production, not hamper it. Regulatory strategies such as a prohibition on groundwater drawdowns greater than 0.1 ft beneath the C-18 Canal may

Matthew Morrison, Director  
August 14, 2002  
Page 2

significantly jeopardize the economical feasibility of Jupiter's Alternative Water Supply Program if left to broad interpretation.

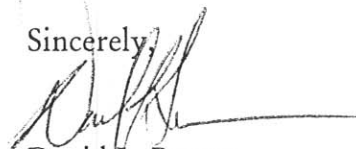
4. Salinity Barrier Feasibility Analysis: We strongly urge the investigation of the feasibility of a structural control to facilitate enhanced restoration of the river's freshwater ecosystem in lieu of wasting fresh water to tide. It is believed that an environmentally sound solution to this option is readily available which would result in far less cost over time plus minimize downstream ecosystem disruption as the southern reaches of the Northwest Fork become less saline.

5. SW Fork MFL: We are greatly disappointed that the District has opted to eliminate the proposed MFL to the SW Fork of the river without properly addressing the need to facilitate the benefits that such a flow would create. It is hoped that the District will come to realize the vast "big picture" environmental benefits of Jupiter's Alternative Water Supply Program and offer support. Failure to secure a cost effective means of RO concentrate disposal will lead to a greater reliance on fresh water supplies which is contrary to our common water management goal.

6. Operational Protocols: The issue of establishing operational protocols for the Northern Palm Beach County Water Supply Projects remains unanswered. Significant concerns exist whether shared adversity is to be the standard of operation in times of drought and whether the SFWMD will be formalizing these arrangements as the operator of the regional system. Without a firm commitment on this matter, it is impossible to judge the appropriateness of any recovery/restoration plan or strategy.

I apologize for the delay of presenting these comments in writing; however, I believe they are reflective of our previous conversations since the publishing of the July 15, 2002 draft document. Should you have any questions, please call.

Sincerely,



David L. Brown  
Director of Utilities

cc: Robert Barolotta, Town Manager  
Jim Anderson, Stemle, Anderson and Associates  
Shannon LaRocque, Assistant Utilities Director  
K:\Water\Mngmt\DAVID\LETTERS\SFWMD\MorrisonLoxMFLLTR.wpd



**Department of Environmental  
Resources Management**

3323 Belvedere Road, Building 502  
West Palm Beach, FL 33406-1548

(561) 233-2400

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Addie L. Greene

**County Administrator**

Robert Weisman

"An Equal Opportunity  
Affirmative Action Employer"

August 22, 2002

Mr. John Zahina, Project Manager  
South Florida Water Management District  
Post Office Box 24680  
West Palm Beach, Florida 33416-4680

**SUBJECT: LOXAHATCHEE RIVER MFL DOCUMENT**

Dear Mr. Zahina:

The following are our department's comments on the July 12, 2002 draft Minimum Flows and Levels for the Loxahatchee River and Estuary, Technical Document. The document was provided to us for our review, and our staff downloaded several of the appendixes from the web site. We will start with general comments first and follow with specific comments.

**General Comments**

In general, we are disappointed that many of our comments that we made in a July 19, 2001 letter concerning the previous draft were either not addressed or only partially addressed. In particular, errors in historical information have not been corrected in the current draft. Because many of our previous comments are still valid, we are enclosing a copy of our previous letter.

We are also disappointed that the document does not look beyond the proposed Comprehensive Everglades Restoration Project (CERP) and Northern Palm Beach County Comprehensive Water Management Plan (NPBCCWMP) projects for Minimum Flows and Levels (MFL) recovery strategies in Chapter 6. As we detailed in our February 28, 2002 comment letter on the NPBCCWMP plan (enclosed), several of these projects have major environmental impacts, appear to have poor cost-to-benefit ratios, and may otherwise not be implementable. We believe that the MFL recovery plan chapter should have taken a fresh look at all projects, eliminated those of questionable benefit, and considered additional projects that might have merit.

A serious deficiency in the MFL recovery plan is a failure to investigate the potential benefits of a stormwater retention reservoir on land along the west leg of the C-18 Canal. This promising option has been given only vague mention under issues to be studied later. As we have noted in previous correspondence, there is 4,600 acres of agricultural land along the west leg of the C-18 Canal that could potentially be used to capture the runoff from 47 square miles of the Loxahatchee River watershed. A 600-acre reservoir with a depth of 8 feet (4,800 acre/feet) could provide 50 cfs of baseflow to the



John Zahina  
August 22, 2002  
Page 2

river for a 90-day period. This reservoir alone could provide almost all the additional baseflow needed to meet the 65 cfs 2018 target, and would help attenuate peak stormwater flows to the river. The reservoir could be funded by eliminating projects with major environmental impacts, like the C-17 and C-51 backpumping projects, and transferring the \$51 million estimated for these two projects to the reservoir. Given the obvious benefits of a C-18 reservoir, we are mystified by the District's lack of interest in this project. We request that the MFL recovery plan chapter be rewritten to evaluate the potential of this project.

### **Specific Comments**

Page 10, 2nd paragraph - The Loxahatchee Slough Natural Area has been left off the list of publicly-owned natural areas and the name of the Beeline Natural Area has been changed to the Hungryland Slough Natural Area.

Page 15, last paragraph - Cypress Creek does not drain the Hungryland Slough and only drains a small portion of Jupiter Farms.

Page 32 - The document states that construction of the C-18 Canal reduced the size of the Loxahatchee Basin from 270 to 210 square miles without saying how. To our knowledge, the construction of the C-18 Canal merely drained the watershed and did not cut any portion of the basin off from the rest. The reduction of the basin appears to be caused by the berming off of the southern portions of the Loxahatchee Slough by the construction of the CSX railroad, which forms the West Palm Beach Water Catchment Area (WCA), and the draining of the portions of the slough south of the WCA by Lake Worth Drainage District. This section needs to be rewritten to explain how the watershed basin was reduced.

Page 43, Table 9 - The Hungryland Slough Natural Area next to the Corbett WMA that the County manages is only around 3,000 acres, not 10,000. If you count the portion of the Hungryland Slough within the Loxahatchee Slough Natural Area, that gives an additional 1,900 acres. However, if you count this acreage, you must reduce the Loxahatchee Slough acreage by the same amount to avoid double-counting the same acreage.

Page 113, Table 3 - The District should be careful about putting much reliance on pond apple as a key species for the valued ecosystem component (VEC). Environmental Resources Management (ERM) staff has frequently observed pond apple growing in more saline conditions than the other five key species. The data in Table 23 supports these observations. Staff reports that in many locations, it is not brackish water that kills pond apple, but destruction of the trunk and aboveground roots by marine boring organisms.

Page 153, 2nd paragraph - The management target statement "Provide supplemental water to the Loxahatchee Slough sufficient to maintain water levels that do not fall below the identified hydroperiod targets by more than six inches during normal years" does not make sense. The target



John Zahina  
August 22, 2002  
Page 3


hydroperiod was developed to replicate the natural Slough fluctuation under normal rainfall conditions, and should be easily met during normal years. In fact, in the western portions of the Slough where the outfall culverts are boarded up, the Slough already achieves the target hydroperiod 90-95% percent of the time in normal rainfall years without any supplemental water. When the Loxahatchee Slough Structure is built, the entire Slough will achieve similar results without any supplemental water. In a normal year, the only way the Slough would fall six inches below the target hydroperiod would be if water was being withdrawn from the Slough after water levels dropped below the target. For the first part of the target statement to be meaningful, it should be changed to read "do not fall below the identified hydroperiod targets by more than two inches during normal years" or this portion of the statement should be deleted. ERM concurs with the second part of the statement about maintaining water levels that do not drop six inches below the target hydroperiod for more than 30 days during drought periods with a return frequency of once every 10 years.

Page 156 - Phase 3 Projects - A project to install a pump station to collect runoff from the Corbett Wildlife Management Area into the C-18 Canal and store it into the Loxahatchee Slough is listed as planned despite our previous objections to this project (see both enclosed letters). ERM manages the Slough, but this project has never been discussed with us or approved by us. There will be very few situations when excess water is available in the C-18 Canal and the Slough is also below its target hydroperiod. Pumping water into the Slough when it is at or above its target hydroperiod is incompatible with the purposes for which it was purchased and the County's proposed management of the Slough. We believe that this project is not cost-effective, as any benefit from C-18 backpumping will be minimal.

As previously stated, any funding for the C-18 backpumping project would be better applied to development of a far more useful C-18 Reservoir project. We request that the C-18 backpumping project be removed from the recovery plan projects and either deleted entirely, or placed on a list of projects requiring further study. If this project remains as a recovery plan component, it should be noted that permission and cooperation from our department is not assured.

Should you have any questions about these comments, please do not hesitate to contact me at (561) 233-2400.

Sincerely,



Richard E. Walesky, Director  
Environmental Resources Management

REW:SF

cc:(with enclosures)(2)

Ken Todd, Water Resources Manager, Palm Beach County  
Patricia Walker, Plan Manager, SFWMD  
Loxahatchee River Coordinating Council



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*"An Equal Opportunity  
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July 19, 2001

Ms. Kathy LaMartina, Program Manager  
District-wide MFL Program  
South Florida Water Management District  
P.O. Box 24680  
3301 Gun Club Road  
West Palm Beach, FL 33416-4680

Dear Ms. LaMartina:

**SUBJECT: COMMENTS ON DRAFT REPORT ENTITLED "MINIMUM FLOWS  
AND LEVELS FOR THE LOXAHATCHEE RIVER AND ESTUARY"**

The Department of Environmental Resources Management (ERM) appreciates the opportunity to comment on the draft technical document describing the methods and technical criteria for developing minimum flows and levels (MFLs) for the Loxahatchee River and estuary. We support the District's efforts to reduce or prevent harm and restore the Loxahatchee River and estuary. Our comments are as follows:

Introduction and Background (page 1) - It would be helpful if the introduction and background explained the relationship between the establishment of MFLs and the requirements and goals of the Loxahatchee River National Wild and Scenic River Management Plan, the Loxahatchee River Watershed Action Plan, and the various state and federal laws affecting management of the Loxahatchee River.

Water Reservation Rules (page 9) - Water reservations rules to achieve the MFLs are to be drafted at some undetermined date in the future. The majority of the flows needed to satisfy the MFLs appear to be coming from the Loxahatchee Slough. We request that no water reservation rules be adopted until minimum (and maximum) flows and levels have been established for the Loxahatchee Slough. Some of the proposed strategies to provide MFL flows to the Loxahatchee River have the potential to cause significant harm to the Loxahatchee Slough. Although we strongly support efforts to provide minimum flows to the Loxahatchee River, it should not be accomplished at the expense of another valuable natural resource area.

Rainfall Data (page 12) - The rainfall data used are from 1982, and do not include more recent studies (for example, Dent 1997 - "Rainfall Variations in the Loxahatchee River Watershed"). The use of the most recent studies will become more critical when future versions of the salinity model that will include precipitation are run.

Tributary Information (page 15) - Cypress Creek does not drain Jupiter Farms or the Hungryland Slough.

History Information (pages 19 - 20) - The private Florida Coast Line Canal and Transportation Company dredged the 50-foot-wide Florida East Coast Canal between Jacksonville and Miami from 1890 to 1912. It was turned over to the federal government in the late 1920s, and was widened, deepened, straightened, and renamed the Atlantic Intracoastal Waterway in the early 1930s. The first Fort Jupiter was present on Pennock Point from 1838 to 1844, and the second Fort Jupiter was present north of Center Street from 1855 to 1860 (DuBois 1981- "The History of the Loxahatchee River"). Fort Jupiter was not present on Jupiter Island in the 1870s, and Henry Flagler was not active in Palm Beach County until the 1890s. The Florida East Coast Railroad bridge was constructed across the Loxahatchee River in 1894. Railroad service to West Palm Beach began in the fall of that year. The first bridge for present-day Alternate A1A was constructed in 1911 (Dubois 1981).

Land Use (pages 33 -34) - The table on page 33 does not include any conservation lands outside of Jonathan Dickinson State Park. The Jupiter Ridge Natural Area and the Juno Dunes Natural Area are in the Coastal subbasin; the Pal-Mar Natural Area and the Loxahatchee River Natural Area are in the Cypress/Pal-Mar subbasin; the Loxahatchee Slough Natural Area, the Hungryland Slough Natural Area, and the J. W. Corbett Wildlife Management Area are in the C-18/Corbett subbasin. These lands should be moved from the undeveloped land use category to the conservation category. The map on page 34 should not show an urban land use designation for unbuilt Unit 11 in the Acreage.

Water Catchment Area - The report is inconsistent in the treatment of the West Palm Beach Water Catchment Area (WCA). This area is not considered part of the Loxahatchee River watershed (pages 13 and 14), but the City of West Palm Beach is considered a major water user in the watershed (page 35). We recommend the following changes: 1) add the portion of the WCA north of Northlake Boulevard to the watershed, since this area currently drains into the Loxahatchee Slough; 2) do not add the WCA portions south of Northlake Boulevard to the watershed until sufficient improvements are made to provide a significant hydrological connection between the WCA and the Slough; and 3) do not include the City of West Palm Beach as a water user until a significant hydrological connection is established.

Water Supply (pages 35 - 36) - The urban water supply demands are significantly overstated by including permitted users outside the watershed. Besides the City of West Palm Beach, the City of Riviera Beach, the Town of Mangonia Park, Good Samaritan Hospital, PBC/Century Utilities, and Palm Beach County (2W, 8W) are all located outside the Loxahatchee River watershed in the C-17 Canal and Intracoastal drainage basins. The only urban users in the watershed are the Town of Jupiter, the Town of Tequesta, United Technologies, the Palm Beach Park of Commerce, and part of Seacoast Utilities. The report includes the total permit amount for Seacoast Utilities, which includes the Hood Road wellfield and the North Palm Beach, Burma Road, and Palm Beach Gardens wellfields. Only the numbers for the Hood Road wellfield, which is in the watershed, should be used. The three other wellfields are in the C-17 or Intracoastal watershed. If a significant hydrological connection to the WCA is established, then the City of West Palm Beach and other water suppliers dependent on recharge from the WCA could be added in the future.

Review of Aerial Photographs - The report contains several incorrect conclusions based on an analysis of the 1940 and 1995 aerial photographs. First, cypress trees are said to have disappeared because of less frequent inundation of the floodplain (page 80, page B-10). The report does not include the most obvious reason that cypress trees disappear - they are cut down. According to Dubois (1981, page 8), the entire Loxahatchee River was logged in 1941. This logging is referred to on pages 20 and 72 of the report. The

statement in the report that the cypress trees remain where the floodplain was wider (and the trees were harder to log since they had to be dragged farther to the river channel) indirectly supports this. The replacement of cypress by swamp hardwoods after logging has been well-documented elsewhere (such as in the Fakahatchee Strand). Mature canopy bald cypress trees will not disappear because of inundation changes, and are quite capable of surviving on dry land. The seedling recruitment phase is when cypress trees are sensitive to water levels. If the trees had died, the dead snags should still be present as the snags are down-river. The logging explanation can be verified by looking for stumps in the areas that cypress disappeared from, or by reviewing other aerial photographs such as the 1953 series available at the local Soil and Water Conservation District office. Second, the statement that slash pine and saw palmetto have invaded the floodplain (pages 79 and B-8) also does not consider the effects of logging. Virtually all of the pine flatwoods in Palm Beach County were logged in the 1920s and 1930s. Without trees, these areas would look like wet prairies in aerial photographs. The pine forest regrew and saw palmetto expanded when wildfires were suppressed. If the soil type is checked in these areas, it will be found to be typical of pine flatwoods and not wet prairie. The incorrect conclusions about vegetation changes are important because they are cited as reasons to support the MFL, when in fact all they demonstrate are the effects of logging. Finally, there were no citrus groves on the river prior to 1940 (pages 78 and B-6). The orange groves in Riverbend County Park, the Reese tract, and the Shunk tract were established around 1900 (Jackson 1978 - "Early History of Jupiter, Florida") and are visible in the 1940 photograph. Their presence is alluded to on page 35 of the report. The Bee Line Highway was present in 1940 (pages 78 and B-5). What was actually present was the Seaboard Airline Railroad (the present-day CSX Railroad). The Bee Line Highway was not constructed until the late 1950s.

Salinity/MFL Analysis - The conclusion of the analysis is that 50 cubic feet per second (cfs) across the Lainhart Dam is all that is needed to maintain the status quo. This amount of water holds the salinity wedge at river mile 8.6, which is in the dead cypress zone and below the zone of stressed and dying cypress (page 87). The proposed MFL is 70 cfs, which would hold the salinity wedge at river mile 8.1, which is below the junction with Kitching Creek, and a significant improvement over current conditions. The Department of Environmental Protection has indicated that a much greater flow will be needed to move the saltwater wedge downstream of Jonathan Dickinson State Park and restore the Loxahatchee River (T. Swihart letter to K. LaMartina, June 18, 2001). There are some indications that this improvement can only be achieved by taking actions that would damage the Loxahatchee Slough (taking too much water out, pumping too much water in). This relates to our first recommendation - that MFLs for the river should not be established until MFLs for the Loxahatchee Slough have been established. Damaging the slough in order to improve the river is not an acceptable tradeoff. Strategies need to be identified that will protect both resources and provide for the future restoration of the River.

Selection of Cypress as Indicator Species - The technical discussion in the report leads one to the conclusion that cypress trees are the key indicator of minimum flow levels and saltwater intrusion into the floodplain. However, other plant and animal species are more sensitive to very small changes in salt concentration for extended periods of time. We recommend that further review be conducted to ensure that a sufficient scientific basis exists for using cypress as the indicator species.

Modeling - General Comments (page 58) - There is some question as to whether the two-dimensional hydrological model used in the plan is suitable for use in predicting freshwater and saltwater inflows to the estuary and the response of the river to these flows. A three-dimensional model, such as that used by the U.S.



Army Corps of Engineers, may provide a more accurate prediction of the effects of saltwater intrusion on both the Northwest Fork and the North Fork of the Loxahatchee River.

Data from a 1982 U.S. Geological Survey study was used in the determination of surface freshwater inflows. We believe that these data are out of date and inaccurate. The watershed has undergone major changes in the last 20 years, including the development of new wellfields, the expansion of row crop agriculture, and construction of many residential housing developments, all of which have the potential to affect freshwater inflows. If more recent data is available it should be used in the inflow determinations. If it is not available, it may be appropriate to implement temporary measures to prevent further harm to the Loxahatchee River and delay the final adoption of MFLs until accurate flow data is available.

It is our understanding that the freshwater inflows from the North Fork of the Loxahatchee River were not included in the modeling runs. We believe that the North Fork should be included in all models and in the final rule because it plays a key role in providing freshwater inputs to the estuary.

Minimum Duration Requirement - The report recommends that the flows delivered to the Northwest Fork of the Loxahatchee River, as measured at the Lainhart Dam, not fall below 70 cfs for more than 20 consecutive days to protect the upstream cypress community against significant harm. The report, however, acknowledges that there is a lack of information concerning the ability of the saltwater wedge to penetrate the floodplain water table and the salinity level that will cause damage or mortality to cypress trees. The 20 day figure is recommended as a "placeholder" until better information becomes available. Since there is data that shows that under a reduced flow regime (e.g. from 65 to 35 cfs) for a 5 - 8 day time period, the saltwater wedge can move upstream a distance of approximately 1.0 - 1.5 river miles (report, p. 101), it would seem more prudent to establish a "placeholder" of 10 days or less.

Proposed Recovery Plan - Backpumping Into the Slough - It appears that pumps are proposed to be placed in the west leg of the C-18 Canal to backpump runoff water from the J. W. Corbett Wildlife Management Area into the Loxahatchee Slough. This action appears to be the mechanism to be used to achieve the 2020 projection that shows the slough permanently flooded, which will be very damaging to the slough. We request that this approach not be taken, and that an alternative approach be used - establishment of a stormwater impoundment along the west leg of the C-18 Canal on agricultural lands.

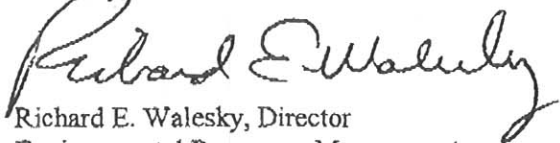
Proposed Recovery Plan - Groundwater Pumping Review - The report contains numerous references as to how lowered groundwater levels have affected freshwater flows to the river. However, there is no clearly stated objective to study the effects of pumping of groundwater for irrigation for the large-scale agricultural operations that border the river, or any commitment to reevaluate and possibly reduce the withdrawals when the consumption permits come up for renewal. As this process proceeds, the consumptive use permits for all currently supplied utilities should be reexamined. The review should include the sufficiency or feasibility of permit conditions restricting pumping during various levels of water restrictions. These actions should be added to the strategies to meet MFL needs.

Proposed Recovery Plan - Culvert Work - There are numerous existing culverts within the watershed that are in need of repair or replacement. Phase 1 of the Recovery Plan should include an evaluation of all existing culverts and repair/replacement as needed.

Kathy LaMartina  
July 19, 2001  
Page 5

Again, we thank you for the opportunity to comment on the report. If you have any questions regarding our comments, please contact me or Jon Van Arnam, Deputy Director at (561) 233-2400.

Sincerely,

A handwritten signature in dark ink, appearing to read "Richard E. Walesky". The signature is fluid and cursive, with the first name "Richard" being more prominent and the last name "Walesky" following in a similar style.

Richard E. Walesky, Director  
Environmental Resources Management

REW:si

cc: Ken Todd, Water Resources Manager, Palm Beach County



Department of Environmental  
Resources Management

3323 Belvedere Road, Building 502  
West Palm Beach, FL 33406-1548

(561) 233-2400

Fax: (561) 233-2414

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"An Equal Opportunity  
Affirmative Action Employer"

February 28, 2002

Ms. Patricia Walker, Plan Manager  
South Florida Water Management District  
Post Office Box 24680  
West Palm Beach, Florida 33416-4680

SUBJECT: NORTHERN PALM BEACH COUNTY  
COMPREHENSIVE WATER MANAGEMENT PLAN

Dear Ms. Walker,

The following are our department's comments on the final draft of the Northern Palm Beach County Comprehensive Water Management Plan, both the Planning Document (PD) and the Technical Support Document (TSD). These documents were provided to us for our review.

**Page 13, PD** - The statement in the second paragraph about much of the slough is covered by exotics is not accurate. Vegetation mapping performed by Erwin in 1992 indicated that 645 acres or approximately 12.4% of the central wetland portion of the Loxahatchee Slough was predominantly exotic vegetation. The acreage may have expanded somewhat since then, but still is estimated as below 20 percent. While the Slough does have a significant amount of exotics, they do not cover much of the Slough. In the same paragraph, there is another erroneous statement that "the slough is serving as a seed source for infestation" of exotics into the Water Catchment Area (WCA). This statement is neither accurate nor supported by any scientific evidence. The Loxahatchee Slough is located north of the WCA and the prevailing wind direction is from the southeast, which would blow nearly all seeds released in the Slough away from the WCA. The seed source for infestation in the WCA is from land along its eastern border and remaining exotics within the WCA. We request that these two statements either be corrected or eliminated.

**Page 29, PD** - The C-17 Backpumping and Treatment project described on this page has a stormwater treatment area (STA) that is located on land that is predominantly native vegetation with large amounts of wetlands. Usage of this land as an STA will result in the destruction of large acreages of native uplands and wetlands, and require high amounts of mitigation with the resulting increased costs. The project could also compete for C-17 basin water with the County's 550-acre SWA Buffer wetland restoration and creation project, which also envisions diverting water from North Palm Beach County Improvement District Canals and the Turnpike Canal, and which is currently in the permitting process. Since the PD says that areas of



Patricia Walker  
Page 2  
February 28, 2002

existing or potential conflict should be identified in the plan (Page v), the discussion of the C-17 project should include this information.

**Pages 29 and 30, PD** - The C-51 Backpumping and Treatment project described on these pages has a STA that is located on a 600-acre parcel known as the Section 1 tract. This tract has been identified as environmentally-sensitive land and has been on the priority list for the County's environmentally-sensitive lands acquisition program since 1991. This land is entirely native vegetation with large amounts of wetlands. Usage of this land as an STA will result in the destruction of large acreages of native uplands and wetlands, and require very large amounts of mitigation with enormous costs. The new supply canal for this STA will have to run through or adjacent to the County-owned Pond Cypress Natural Area for 2.75 miles and could have major impacts to this nature preserve. Our department expects that the land targeted for the STA will be acquired by the County for environmental preservation and/or mitigation for road construction impacts, and will not be available for use for an STA by the time project construction is expected to start in 2008. Since the PD says that areas of existing or potential conflict should be identified in the plan (Page v), the discussion of the C-51 project should include this information.

**Pages 36 and 37, PD** - The discussion of the C-18 Reservoir is flawed by unfounded assumptions and unevenly applied criteria. There is not a limited availability of land in the west C-18 basin, as is frequently stated. There is 2,700 acres of agricultural land in the Vavrus ranch and 1,900 acres in the Mecca Farms tract. Representatives of both of these owners have expressed to us a willingness to consider a sale. We note that there is far more land available in the C-18 basin than is available in the C-51 or C-17 basins, yet neither of the two STA projects in those basins are described as having limited land availability. The discussion also limits the reservoir's depth to 6 feet without explaining why it could not be deeper. Finally, it states that a C-18 reservoir was insufficient to meet needs in a 1-in-10 year drought. Many components in the PD do not meet 1-in-10 criteria, including the regional conveyance system (Pages 23, 31, and 38, TSD). We request that either the 1-in-10 year criteria be eliminated from the discussion, or that the performance of all components of the PD be discussed for this criteria.

We note that the best performance for the Loxahatchee Slough and the northwest fork of the Loxahatchee River in avoiding exceeding high and low water target levels was for modeling runs 3 and 6, which included a limited 300-acre C-18 reservoir (Tables 15 and 16, PD). We believe that the performance would even be better if an adequately-sized reservoir was modeled, as it would attenuate stormwater flows and provide additional baseflow to the river. A 600-acre reservoir with a depth of 8 feet (4,800 acre/feet) could provide 50 cfs of baseflow for a 90-day period. This would be nearly all the 5,000 acre/feet annual deficit identified for the river (Page 24, PD). We note that stormwater from approximately 47 square miles could be directed to this reservoir, which is far more than the 33 square miles in the C-17 basin, where a stormwater retention area is proposed.

It seems obvious to us that both a C-18 reservoir and the regional conveyance system will be necessary to meet the needs of the Loxahatchee River. The reservoir could help to relieve some of

the demand on the regional system, and might make components with major environmental impacts, like the C-17 and C-51 backpumping, unnecessary. The \$51 million estimated for these two projects (Page 26, PD) could then be utilized for the reservoir. We request that the section on the C-18 Reservoir in both the PD and the TSD be re-written to eliminate unfounded assumptions and selectively-applied criteria. These sections should present the information on this component in a fair-handed manner and indicate how the potential of this component will be examined. We advise that land acquisition for this component needs to be undertaken as soon as possible as the land may not be available several years into the future.

**Page 39, PD** - At the bottom of the third paragraph, there is a statement that a high rate of inflow from the C-18 Canal at the Mirasol site was to refill wetlands in the eastern Loxahatchee Slough drained by the opening of the S-46 structure. This statement is incorrect. The C-18 Canal is maintained at 14.8 feet (page 39, PD) and the Slough is completely dry at 15 feet (page 36, PD). The C-18 water does not flow uphill to refill these wetlands. The inflows at the Mirasol site are caused by a direct connection from the C-18 Canal, via the Mirasol site drainage canals, to the Turnpike canal. The Turnpike canal is drawn down to levels of 11 to 12 feet by the Hood Road wellfield pumping. This statement should either be corrected or eliminated.

**Page 48, PD** - We request that the County's SWA Buffer wetland restoration and recreation project be added to Table 6. The project was initiated in 2001, Palm Beach County is the lead agency, and the estimated projected cost is \$10 million. The phrase "six new culverts" after the C-18 Culvert Connections to the Hungryland Slough project name should be deleted and replaced with "removal/replacement of existing culverts"

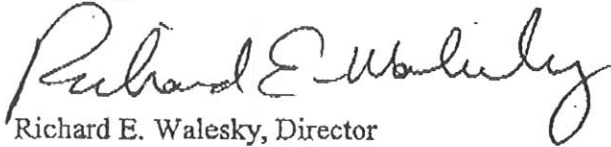
**Pages 55 and 56, PD** - We request that the recommendations on these pages to install a pump station to collect runoff from the Corbett Wildlife Management Area into the C-18 Canal and store it into the Loxahatchee Slough be deleted. We are not sure whether this is the same component as the back-pumping from South Indian River Water Control District (SIRWCD), but are opposed to both. Development of this pump station presupposes that the C-18 Reservoir will not be built. We believe that the reservoir will be found necessary and the pump station will be redundant. We also believe that additional storage for SIRWCD water should be found within SIRWCD's system. In any case, we believe that any benefit from C-18 backpumping will be minimal. There will be very few situations when excess water is available in the C-18 Canal and the Loxahatchee Slough is also below its target hydroperiod. Pumping water into the Slough when it is at or above its target hydroperiod is incompatible with the purposes for which it was purchased and the County's proposed management of the Slough. We are unable to tell if there is any significant benefit from the SIRWCD backpumping since it was modeled in five of the six modeling scenarios (page 7, TSD), but the benefits seem to be minimal. The regional conveyance system improvements are supposed to meet the minimal additional water requirements of the Slough and deliveries to the Slough are used as part of the justification for these improvements. We request that no action be taken on any C-18 backpumping until a final decision has been made on the C-18 reservoir, and that any benefits from

Patricia Walker  
Page 4  
February 28, 2002

the backpumping be clearly defined separate from other components and determined consistent with the constraints under which the Slough will be managed.

If you have any questions, please do not hesitate to contact me at (561) 233-2400.

Sincerely,

A handwritten signature in cursive script, reading "Richard E. Walesky". The signature is written in dark ink and is positioned above the printed name and title.

Richard E. Walesky, Director  
Environmental Resources Management

REW:SF:dkg

cc: Robert Weisman, County Administrator  
Gary Dernlan, Director, Water Utilities  
Michael Voich, Project Manager, SFWMD  
Loxahatchee River Coordinating Council

MARGE KETTER  
7088 SE Rivers Edge  
Jupiter FL 33458  
561-747-9487

September 3, 2002

Mr. Thomas F. McCracken, Dept. Director  
Land & Management Operations  
South Florida Water Management District  
P. O. Box 24680  
West Palm Beach FL 33416-4680

FAX 561-681-6233

RE: OBJECTION TO DRAFT PROPOSED CONDITIONS OF PUD APPROVAL OF  
JUPITER ISLES RELATING TO 95.1 ACRES OF PINE FLATWOOD FOREST OWNED BY  
SFWMD LYING WEST OF AND ADJACENT TO JUPITER ISLES.  
JUPITER TOWN COUNCIL FINAL HEARING RE JUPITER ISLES 9/3/02 7PM

Dear Mr. McCracken:

As a user, friend, and neighbor of Jonathan Dickinson State Park, I object to your approval of the above mentioned document proposed by John Fenniman on behalf of Schickedanz Capital Group LLC.

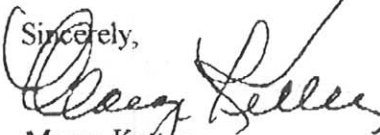
Any effort by the developer to mitigate the lack of adequate buffer on the western boundary of the Jupiter Isles project is unacceptable.

The 660-foot buffer in the 2000 Loxahatchee River Wild & Scenic Management Plan must be enforced. Complying with the Management Plan is required; it is not discretionary. The Plan requires increased buffering. It is not appropriate for you to support a 25-foot buffer when the Management Plan calls for 660.

SFWMD, DEP, local governments, and other agencies, all signed on to this Plan.

Members of the public are incensed the Plan is not being enforced!

Sincerely,



Marge Ketter

cc Albert Gregory, Div. Rec. & Parks  
Mark Nelson, Park Manager  
Dick Roberts, Park Biologist  
Roger Bursey, Pres. Friends of JDSP

Catherine Dwore  
13105 Silver Fox Trail  
Palm Beach Gardens, FL 33418  
561.624.9032

September 3, 2002

Mr. Thomas F. McCracken  
Director, Land Management Operations  
South Florida Water Management District  
PO Box 24680  
West Palm Beach, FL 33416-4680

RE: OBJECTION TO DRAFT PROPOSED CONDITIONS OF PUD APPROVAL OF JUPITER ISLES RELATING TO 95.1 ACRES OF PINE FLATWOOD FOREST OWNED BY SFWMD LYING WEST OF AND ADJACENT TO JUPITER ISLES

Dear Mr. McCracken:

As a user and friend of the Jonathan Dickinson State Park I am writing to object to approval by SFWMD of the above mentioned document proposed by John Fenniman on behalf of Schickedanz Capital Group, LLC.

This document provides no real protection to the park and is virtually unenforceable by the Town of Jupiter. Further, it places Jonathan Dickinson State Park/DEP and SFWMD in the position of taking action against a Homeowners Association and incurring the cost of potentially perpetual conflict in order to seek enforcement. Such conflict is best avoided by insisting that the Town of Jupiter protect the Park and the river from degradation of resources by exercising its land use and zoning authority to increase the buffer. Finally, it is entirely inappropriate for SFWMD to approve this document and the twenty-five foot (25' buffer) when the Loxahatchee River Management Plan, which the district has adopted, calls for buffer more in keeping with six hundred and sixty feet (660') buffer enacted by Palm Beach County.

The matter of Jupiter Isles will come before the Town of Jupiter Town Council this evening and it is my understanding that the applicant, Schickedanz Capital Group LLC, through legal counsel John Fenniman, will portray to the Town Council that the SFWMD supports this document. For the reasons I have outlined above the district should NOT support this document. I urge you to reject this agreement and authorize staff representation at the Town Council meeting this evening to enter the District's objections into the record.

Sincerely,



Catherine Dwore

Cc: Mr. Henry Dean  
Mr. Fred Davis  
Mr. Chip Merriam  
Ms. Pat Walker

**Subject:** presentation of mf & levels for LR & estuary at EAC mtg 9/3/02 & the draft documents

**Date:** Wed, 04 Sep 2002 19:45:16 -0700

**From:** Thomas & Elizabeth Poulson <tomandliz@adelphia.net>

**To:** jzahina@sfwmd.gov

**CC:** jaminfo@aol.com, mmorrison@sfwmd.gov, dswift@sfwmd.gov, cmccart@sfwmd.gov, twaterhouse@sfwmd.gov, vanarman@sfwmd.gov, mjmorris@sfwmd.gov

Dear colleagues:

I give the following critique as an ecologist that does long-term (decades) field work to use natural experiments to distinguish among multiple hypotheses. My primary expertise is with cave ecology and management (40 years of research and consultation, including 3 summers as an Ecological Consultant at GS-14, at Mammoth Cave National Park) but I have also worked with succession at Indiana Dunes National Lakeshore and with old-growth forests (especially beech - sugar maple) where I have evaluated multiple hypotheses about forest dynamics over decades to centuries. I have also been on the scientific advisory committee for TNC - Illinois.

I was impressed & largely convinced by your responses to the peer review of your initial document:

1. improvement of the salinity prediction model & verification thereof (John)
2. explanation of how continued change in structures and protocols will further improve  
the MFLs delivered to the LR (Matthew)
3. multiple criteria for picking a group of plant species that will be surrogates for the  
"health" of the freshwater parts of the LR (draft document)

I was less impressed by the lack of good criteria for the short-term + or - responses of the freshwater ecosystem to management and natural events like hurricanes and drought. You need to fill in these gaps.

1. Your data on "seedlings" (< breast high) and "saplings" (> breast high & < adult size --  
criteria for adult never indicated) are inadequate. You need to go back to what I hope are  
permanent transects and get detailed data that will give real size-frequency distributions.  
As you point out in your prose, the smallest size classes are the indicators of whether  
the species are replacing themselves. In this context you need to look at the literature  
about your indicator species, especially cypress, to see whether they require rare events  
for regeneration (alternatives include at least periodic drought, periodic floods that create new  
channels or isolating new oxbows, and/or large windfall gaps)
2. Your prose in several places talks about criteria for stress of living trees but you never  
either lay out these criteria or provide data. These criteria are at least partially species  
specific. For example the abundance of epiphytes on cypress & galls may be indicators  
and the narrowing of trunk growth in cabbage palm may be an indicator. For all species  
partial defoliation and dieback are criteria.

I was completely unimpressed with your response that you need not push for 50 or 60 cfs mfls NOW  
because of supposed tradeoffs of the + side of enlarged estuarine areas and - sides of slower  
restoration. Neither your discussion nor the data from Dent and Ridler

support your suggestion

that the LR estuary has become a prime estuarine habitat. Compared to the Indian River lagoon:

1. red mangrove are less extensive with almost no forests
2. there are no fish or shrimp or oyster data to show that game or food species are  
doing well or even present in the LR estuary
3. the sea grass diversity is much less and not abundant enough for manatee or green turtle
4. manatees like more fresh and less fully saline water

So, I hope you take my comments as the constructive criticism that I intend and further improve the great job that you have started. I will, of course, be happy to discuss any of the above with any or all of you.

Take care, Tom

Thomas L. Poulson  
Emeritus Ecologist U. Illinois - Chicago  
Adjunct Professor in the Honors College FAU - Jupiter  
Ecological Consultant to ARM  
Short courses in ecology & natural history for kids - adults at Abacoa,  
HC-FAU, TNC, LLS-FAU



The Loxahatchee River Coalition's  
Public Response to the recommended  
Minimum Flow & Levels for the Loxahatchee River & Estuary

DRAFT – September 12, 2002

*Introduction*

The Loxahatchee River Coalition is comprised of various environmental and community-based organizations and individuals committed to preserving, and restoring, and protecting, the Loxahatchee River. While we appreciate the consideration that the South Florida Water Management District (District) staff and the District Governing Board have given to the comments of various sectors of the public, we have serious concerns as to the July, 2002 Draft of the Technical Document on Minimum Flow Levels (MFL) for the Loxahatchee River and offer the following comments in the spirit of constructive participation in the development of a restoration plan for the River.

*Concerns Regarding Preservation of the River*

**I. Current data is incomplete**

The District's Staff has indicated that the current data sets they are using are incomplete and therefore they should take into consideration a seasonally fluctuating minimum flow based on prior comprehensive research.

In a meeting with the Loxahatchee River Environmental Control District [LRED] on August 7<sup>th</sup>, SFWMD staff indicated that District data on salinity and flows for the Loxahatchee River is incomplete. LRED offered to share the bi-monthly data that they have collected for over ten years. SFWMD staff asserted that they need to install salinity, flow and temperature probes at various points in the river and that after one year they will have enough data to extrapolate a more complete model. Based on District staff comment we conclude that the SFWMD's current dataset is insufficient to construct an MFL regime that will adequately protect the River. While the District develops a more complete model, we suggest the District investigate use of the LRED's research, especially as interpreted in "Freshwater Flow Requirements and Management Goals for the Northwest Fork of the Loxahatchee River" (Dent & Ridler, 1997). This study recommends a minimum flow of 75 cfs for the height of the dry season (April-May) and suggests a seasonally fluctuating minimum flow up to 130 cfs throughout the wet season (July-November).

**II Florida law requires the establishment not just of minimum flows, but also minimum levels.**

Specifically, Florida Statutes §373.042 requires that water management districts develop minimum flows and levels for surface waters and aquifers<sup>1</sup>. The District's documentation and recommendations would only address part 1a of this statute by recommending a minimum flow

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<sup>1</sup> Florida Statutes, Section 373.042(1a-b)

of 35cfs over Lainhart Dam<sup>2</sup>. It does not, however, recommend an explicit minimum level as required by part 1b.

### **III Minimum levels are required to prevent further harm and degradation to the River**

Although the Lainhart and Masten dams could arguably enforce their own specific minimum levels upstream (the height of the dams), a minimum level needs to be set for that segment of the River that lies downstream of the Masten dam. If the District is determined to prevent further saltwater incursion, it cannot do so without setting a minimum level or otherwise ensuring that minimum flows over Lainhart are increased in proportion to unexpected changes in flows from groundwater and tributaries.

Since District staff has conceded that knowledge of the hydrodynamics and ecology of the Loxahatchee River and Estuary is incomplete,<sup>3</sup> it is therefore conceivable that supplying a minimum flow of 35cfs over Lainhart Dam may not be sufficient to keep the salinity at river mile 9.2 from exceeding 2ppt<sup>4</sup>. To safeguard against potential flaws in the District's minimum flow modeling, an explicit minimum level needs to be set for river mile 9.2 in conjunction with the 35cfs minimum flow over Lainhart Dam.

### **IV. Recommended minimum flow requires more controls**

For the current recommendation of 35cfs over the Lainhart Dam to work effectively, more controls are needed.

Due to the lack of data for groundwater and stream flow from tributaries, the model calibration was based on the historic flow recorded at Lainhart Dam to estimate the total freshwater input to the river system. In the model, discharges from tributaries were calculated as a constant fraction of the discharge at Lainhart Dam (i.e. total surface freshwater input in the model was linked to Lainhart Dam flow via flow ratios<sup>5</sup>. Flow factors of 0.65 for Cypress Creek, 0.14 for Hobe Grove, 0.08 for Kitching Creek, 1.4 for Trappers and 1.16 for LOXTnpk were established. For example, if the flow at Lainhart Dam was in fact 100cfs, the model would recognize the flow for Cypress Creek at 65cfs, 14cfs for Hobe Grove, 8cfs for Kitching Creek, 140cfs for Trappers, and 116cfs for LOXTnpk.

Another assumption used in the model was a constant input from ground water of 40cfs. Cypress Creek, Hobe Grove, Kitching Creek and the NW fork at Trappers each received 10cfs of groundwater input for a total ground water input of 40cfs.

These model assumptions have important ramifications:

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<sup>2</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, p. 149

<sup>3</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, p. vi

<sup>4</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, p. 148

<sup>5</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, p. 79

1. The total inflow to the NW fork associated with a flow of 35cfs at Lainhart Dam is considerably larger and includes discharges from groundwater and tributaries. Under the 35cfs at Lainhart Dam Scenario, tributary flows would be modeled as follows: Cypress Creek 33cfs, Hobe Grove 15cfs, Kitching Creek 13cfs, Trappers 59cfs, & LOXTnpk 40cfs (flows include groundwater contributions of 10cfs).
2. The flows for the tributaries were assumed to be proportional to the flows from Lainhart Dam and hence may not accurately represent actual flows, especially with depressed water tables.
3. Groundwater levels that produce the assumed groundwater input may not be present when needed most.

The following controls would mitigate potential problems under the current proposal:

1. The establishment of a minimum level for groundwater so that the groundwater level that produces 40cfs in the model is adequately protected.
2. The establishment of minimum flows for the tributaries in order that their modeled flows corresponding to the Lainhart Dam minimum flow of 35cfs are protected.
3. When tributary surface water flows fall below their corresponding modeled flows for 35cfs at the Lainhart Dam, then the Lainhart Dam flows are to be increased by the difference.
4. When groundwater levels fall below the level needed to produce the modeled 40cfs contribution, then Lainhart Dam flows are to be increased to be commensurate with the groundwater loss.

#### **V. Florida law requires MFLs for the entire River.**

Florida Statutes §373.042 provides explicitly that the water management districts shall establish minimum flows “for all surface watercourses.”<sup>1</sup> It was not the intent of the statute to require that the districts establish minimum flows only for federally recognized wilderness preserves. In fact, the law states that the districts shall establish minimum levels for groundwater, as well as, surface waters. Given the rate of development in the adjacent areas, we are concerned about the impact of further groundwater withdrawals not only on the river, but also on the surrounding protected areas (Jonathan Dickinson State Park, Riverbend Park, Cypress Creek Tract, and Pal Mar, etc.).

Although the Wild and Scenic portion of the NW Fork is an exceptional natural resource, the entire river is of significant ecologic, economic and aesthetic value to Palm Beach County and the State. The estuary is home to a thriving fishing and boating economy that contributes important revenue to the local economy. Riverfront property is among the most valuable in the area and homeowners have a vested interest in the health of the entire River. We do not agree with the District’s reasons for setting only a minimum flow for a small segment of the NW Fork

based on the lack of “infrastructure and facilities.”<sup>6</sup> The statute in question does not ask the District to “provide and manage”<sup>6</sup> flows. It requires the District to determine minimum flows and levels beyond which further withdrawals would be “significantly harmful to the water resources or ecology”<sup>1</sup> thus providing the districts with a limit at which to prevent further withdrawals.

## **VI. Sampling conducted to date is insufficient**

In the June 10<sup>th</sup> draft of their FAQ about MFLs for the Loxahatchee River, the District staff cites that peer review observed that cypress trees were “not particularly good indicators of salinity stress.”<sup>7</sup> In response staff selected a number of Valued Ecosystem Component [VEC] species. Although the District staff appears to have done a good job at assessing the health of the selected species, the selection of only large, woody plants<sup>8</sup> provides only a very narrow cross-section of the River’s diverse population and is not a true indicator of overall river vegetation.

In our opinion the VECs of the river must necessarily include aquatic life such as herbaceous aquatic plants, fish, amphibians, and other species that are more sensitive to saltwater intrusion than just the few selected species.

## **VII. The report is overly reliant on aerial photography and contemporary data regarding the health of the River**

In our opinion the District has relied too heavily on aerial photography in the assessment of the River’s health and failed to obtain enough detailed hydrological & biological information (or “ground truth”) necessary to properly support the broad assumptions based on the extant photographic record. Furthermore, the District has not satisfactorily addressed the possibility of harm that might have occurred between 1995 and 2002.

On page 123, the Draft states, “...19 additional acres [of freshwater vegetation] were lost from this community between 1985 and 1995.” It does not indicate how many acres have been lost between 1995 and 2002. Throughout the Draft, the District presents 1995 (mainly photography) data as if it is up-to-date. If no aerial photography is available for 2000 or later then a thorough ground survey may be required in order to accurately determine the state of the River and watershed today.

In our opinion the District staff have not been provided with the resources required to accurately measure the River’s current condition and how that condition has changed over time. While staff has surveyed the encroachment of mangroves into the cypress forest up until 1995 but we remain unconvinced that substantial damage has not occurred to the River since 1985. Furthermore, the justification for using the date of the River’s Federal Wild and Scenic River (1985) as a

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<sup>6</sup> *Loxahatchee River Minimum Flows and levels: SFWMD staff responses to comments and frequently asked questions*, June 10, 2002 draft, Question no. 18

<sup>7</sup> *Loxahatchee River Minimum Flows and levels: SFWMD staff responses to comments and frequently asked questions*, June 10, 2002—draft, Question no. 13

<sup>8</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, Table 31, p.116

benchmark (or base) for setting the MFLs, has not been substantiated. The state requirement for MFLs was created through the enactment of §373.042, *Florida Statutes* in 1972 and the designation of Jonathan Dickinson State Park occurred in late 1940's. If a date is needed for determining what stage of freshwater flow the MFLs should aspire to, then the District should use the designation of the State Park.

### **VIII. Seasonal variability is an important consideration.**

A static minimum flow does not take into account seasonal variability, which is essential for the preservation of the River's natural systems.

The District touches on seasonal variability in pp. 11,12 and 97, and on the erratic nature of that variability from year to year (often as the result of hurricanes, storms, El Niño, etc.) in Figure 4 on p. 12. It does not, however, significantly address how native biota are dependent on such variability as did the SJRWMD in setting MFLs for the Wekiva River System.<sup>9</sup>

The SJRWMD, under the direction of Henry Dean in 1994, felt very strongly that setting one static minimum flow or level cannot sufficiently preserve either a lotic or lentic system as, over time, such a minimum often becomes the *de facto* average.<sup>10</sup> The SJRWMD felt that lotic systems were best protected by a regime of multiple MFLs. It is for this reason that the MFL regime worked out for the Wekiva River, by SJRWMD is so exemplary. We can find no justification for setting an MFL that affords less protection to the Loxahatchee River.

### **IX. As currently written the MFL Criteria would harm the Loxahatchee River**

As currently written, the MFL Criteria would allow the minimum flow to be evaded substantially over-time and throughout the year, which would harm the River.

The wording of the minimum flow criteria needs to be corrected.<sup>11</sup> As it could be misinterpreted to suggest that, during dry periods, the minimum flow over Lainhart Dam could be allowed to fall below the minimum for 20 days at a time, repeatedly, so long that it is brought back up to 35cfs every 21<sup>st</sup> day. Under such an interpretation, the policy would allow the minimum to be met as few as 17 isolated days throughout a year (4.72% of the time). We doubt that, under the current modeling, this would be sufficient to prevent further harm.

We suggest that the criteria include a policy wherein low flows trigger water restrictions, as per Henry Dean's outstanding work on the Wekiva River MFL regime<sup>12</sup>, or a limit on how many days the flow may fall below the minimum throughout a single year.

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<sup>9</sup> *Establishment of Minimum Flows and Levels for the Wekiva River System*, St. Johns River Water Management District, 1994, p. 16

<sup>10</sup> *Establishment of Minimum Flows and Levels for the Wekiva River System*, St. Johns River Water Management District, 1994, p. 15

<sup>11</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15, 2002 draft, p.149

<sup>12</sup> *Establishment of Minimum Flows and Levels for the Wekiva River System*, St. Johns River Water Management District, 1994, p. 68



**X. There is no evidence to support the 50% reduction of the Minimum Flow from 70cfs to 35cfs**

There has not been shown significant credible scientific evidence in the July 2002 draft to support the reduction of the staff's recommended minimum flow over Lainhart Dam from 70cfs, in its May 2001 draft, to 35cfs. The modeling has not significantly changed between the two drafts to support such a drastic reduction.

In 2001, District staff recommended a minimum flow of 70cfs over Lainhart Dam in order to preserve the remaining freshwater habitat up to river mile 8.1 on the basis that as recently as 1970 a healthy bald cypress ecosystem resided in this area<sup>13</sup>. It was the staff's intention, at that time, to keep the saltwater wedge near river mile 8.1. This year, staff has decided to reduce that recommended minimum by half, nearly to a level of flow that staff previously believed would be disastrous to the freshwater cypress forest:

“A continuous discharge from Lainhart Dam within the 30 cfs range would allow saltwater to penetrate as far as 9.0 miles upstream which is within the remaining “healthy” cypress zone. Allowing saltwater to penetrate this far upstream would set up the opportunity for saltwater contamination of the floodplain groundwater system that could potentially result in the stress or mortality to the remaining bald cypress community. Such an event would be considered significant harm to the water resources or ecology of the area.”<sup>14</sup>

30cfs is not much less than 35. Under the flow criteria proposed in the 2002 draft, wherein flows over Lainhart may be allowed to fall below 35cfs for up to 20 days at a time, it is reasonable to assume that the saltwater wedge will continue its encroachment upon the freshwater habitat. We have not found convincing hydrological support in the current document to justify such a marked change in recommended minimum flow.

The District acknowledges that a significant part of the National Wild & Scenic portion of the NW Fork was already seriously harmed by 1985<sup>15</sup>. In our opinion, it was the responsibility of the District, as custodians of the River, to initiate restoration of the River at the time of its Wild & Scenic designation. All of the parties adopting the Loxahatchee Wild and Scenic River Management Plan are charge with preserving and enhancing the River to the fullest extent of its authority. To the extent that the District maintains the River in a damaged condition, neither preserved nor enhanced, it has failed to fulfill its agreement with the other agencies and the People of the State of Florida.

*Our Recommendations*

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<sup>13</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, May 22<sup>nd</sup>, 2001, p. 100

<sup>14</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, May 22<sup>nd</sup>, 2001, p. 101

<sup>15</sup> *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*, South Florida Water Management District Water Supply Division, July 15<sup>th</sup>, 2002, p. 131

The Loxahatchee River Coalition recommends that the District, in cooperation with the DEP and the public, develop a MFL regime that:

1. Sets explicit minimum flows and levels for the river and its major forks and tributaries;
2. Sets seasonal minimum flows and levels for wet and dry periods in order to preserve the natural seasonal variability of the river's hydrology, or in the alternative, sets explicit minimum low flows and levels, minimum average flows and levels and minimum high flows and levels;
3. Sets trigger points at which compulsory water restrictions come into effect;
4. Sets trigger points at which moratoria on further consumptive use permits are enacted; and
5. Dovetails with the restoration plan being developed by the District in cooperation with the Florida Department of Environmental Protection, the Florida Park Service, and the public. We hope this will also include a more aggressive land acquisition effort and the creation of more reservoir sites.

If the District is compelled, for whatever reason, to adopt a minimum flow for the Northwest Fork of the River, we encourage the District set a temporary minimum flow matching the District staff's recommendation in 2001, of not less than 70cfs over the Lainhart Dam. This recommendation is made with the expectation that the District address the additional scientific and policy issues outlined in the many public response documents, and move forward with a restoration MFL. Setting the temporary MFL at 70 cfs provides a more realistic assurance of both preventing further harm to the River and anticipating the eventual restoration of the wild and scenic segment.

The staff's recommended MFL criteria is inconsistent with the district's charge under the Wild & Scenic designation to "preserve & enhance" the River. Maintaining the Wild & Scenic river in a seriously harmed condition constitutes neither preservation nor enhancement. As far as the Wild & Scenic portion of the River is concerned, we ultimately expect to see an MFL criteria based on restoration of the entire Wild & Scenic corridor. Such an MFL criteria must necessarily protect flows from the River's tributaries, ensure seasonal variability and protect freshwater contributions from groundwater by setting a minimum level for surface waters both down and upstream of the Lainhart & Masten dams. An MFL that does not preserve and enhance the River to the Park Boundary, fails to meet the goals set in 1985 under the Wild & Scenic designation.

We look forward to working with the District to restore and protect the Loxahatchee River.



**Received from Rim Bishop on September 17, 2002**

John,

I may have misplaced it, but would you send me a copy of the Exhibit discussed in the following August 2 e-mail please?

Also, is there a more current draft of the MFL documents, one dated later than July 25 edition? We pulled the current draft down from the SFWMD web site and found that none of our August 2 or August 6 comments have been incorporated.

Essentially, I need to know whether SFWMD will be incorporating our comments or not. As you can see, we have put considerable effort into this, and I must evaluate whether further participation in the public process will be useful.

Finally, here are a few additional comments on the Loxahatchee River and Estuary MFL document July 12 draft that I hope you will find helpful.

1. Page 156, first bullet under "Phase 2 ..." - with culverts connecting the Loxahatchee Slough to the C-18 having already been boarded by PB County Dept. of Environmental Resources Management, please identify how construction of the G-160 structure will generate 5,000 acre feet of ADDITIONAL storage. We are having difficulty identifying any storage made available by the structure other than that which is within the C-18 canal section itself, and that doesn't seem to amount to 5,000 acre feet.
2. We renew our request for Exhibit I. We would very much appreciate the opportunity to have our hydrologist review and comment.
3. We would again draw your attention to our August 6, 2002 transmittal and respectfully request that our comments be fully incorporated into the next draft.

Thank you so much for your assistance. If you require further information, I hope that you will not hesitate to contact me.

**Received from Rim Bishop on October 2, 2002**

John, here are a few Seacoast comments on the draft Appendix I to the Lox River MFL, Exhibit I document. Please forward them to the appropriate parties.

1. Page I-3 - I know that the scale of this map is small, but the distinction that I am about to make is VERY important. Looking at the map, one might get the impression that Seacoast operates wells located west of the turnpike, near the Slough. First, the word wellfield(s) should be singular - only the Hood Road wellfield is located in the general vicinity shown. Second, the Hood Road wellfield is EAST of the turnpike, not west. It is also SOUTH of Hood Road.

2. Page I-6 - Beginning in 1997, Palm Beach County DERM boarded up old water control structures, thus causing the Slough to retain the storm water that, during the 1988 -1995 Actual Pumpage period, was runoff to the C-18. In addition, in 2001, the Mirasol (Golf Digest) surface water management system was implemented, also changing the hydrology from conditions that existed in the 1988 - 1995 period. These are substantial and material changes, and the report does not appear to consider them.

Finally, to repeat a comment submitted to you earlier, we question whether Lox Slough leakage factors applied to the model correspond to field observations (e.g., water level readings) taken in the Slough after PB County DERM boarded it up in 1997. Seacoast's observations indicate that once water levels in the Slough were raised, they remained high longer than originally anticipated. Thus, where the Slough was a C-18 contributor via runoff before 1997, it is much less so now via percolation, and we are not certain that the model accurately reflects that low percolation rate.

Thank you again for the opportunity to comment. If you wish to discuss these comments, I hope that you will not hesitate to call.

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Thank you again for the opportunity to comment. If you wish to discuss these comments, I hope that you will not hesitate to call.

**Received from Rim Bishop on October 2, 2002**

John, we'd like to offer the following technical review comments to supplement the e-mail submittal I sent earlier today.

We generally ask our technical consultants to review document drafts, ours or those of others, as though the consultant were serving as an expert witness for a party pursuing a legal challenge. That type of intense review usually uncovers assailable flaws and allows us the opportunity to address them before the document is released.

Of course, that is by no means Seacoast's perspective, but we find that properly framing our requests for professional assistance adds context, and consequently substance, to our consultants' review. We hope that you accept our comments in the highly constructive spirit in which they are intended.

Thanks again for your serious consideration.

**TECHNICAL COMMENTS ON DRAFT APPENDIX I, LOX RIVER MINIMUM FLOWS AND LEVELS DOCUMENT**

The author heavily qualifies the capability of the model to estimate with any accuracy surface-water flows when he states.

"The code does not incorporate a surface/groundwater module" and "overland flow and associated surface water routing through canal networks is not directly simulated and the effects of consumptive use withdrawals on overland and riverine flows should only be considered as gross estimates." (p. I-1).

Although the SFWMD version of MODFLOW-96 appears to have a Wetland and Diversion Package and an Operations Package, it appears that "the code utilized in this report does not incorporate a surface/groundwater module" and "overland flow and associated surface water routing through canal networks is not directly simulated and the effects of consumptive use withdrawals on overland flows should only be considered as gross estimates". (p. I-2).

"MODFLOW is a groundwater model that does not have the capability of simulating storm-driven events". (p. I-5).

"For calibration of flow, absolute errors were less than 10 cfs during 55 percent of the simulation period." This is another way of saying that absolute errors were equal to or greater than 10 cfs during 45 percent of the simulation period." Ten (10) cfs represents 40 percent of the recorded mean flow of 24.1 cfs, a considerable error. (p. I-5)

These statements do not provide any encouragement that the model has any value in establishing or defending MFLs for the Loxahatchee. In addition, the following points must be noted.

The method of converting stages observed or predicted at Lainhart Dam to flows by means of the "weir equation" is not documented here. (p. I-5).

The 10 cfs absolute error is significant (p. I-5)

Under "Model Application", what "proposed" surface water systems are referenced at the bottom of page I-5?

The title of the third simulation (p. I-6) should be "Currently Permitted" model run as it is based on recent permits rather than those in the earlier data periods.

If "variations in withdrawal rates due to seasonal changes were not taken into account" in the "Permitted" model run, does that mean the rates used were annual allocation rates rather than maximum-day or maximum-month rates? This is probably true but needs clarification. It may be explained in an earlier report.

There is no explanation for how the data from the model were "adjusted" to represent an average rainfall year and drought conditions. (p. I-6) Were these input or output data? This may have been explained in an earlier report but is not clear here.

It is unclear from Table I-1, which flows are actual and which ones are predicted. What does it mean that the flows delivered to Lainhart Dam were estimated from the model and "adjusted" to equal actual flows? (p. I-8)

The percent reduction in flows for each of 3 classifications was discussed. What were the withdrawal rates for the 3 classifications?

October 16, 2002

Ken Ammon, Director  
Water Supply Department  
South Florida Water Management District  
P.O. Box 24680  
West Palm Beach, FL 33416-4680

Dear Ken:

I have attached for your review the technical and specific comments provided by DEP staff on the District's July 15, 2002 Draft *Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary*. I have separated the comments into two categories: those concerns related specifically to the methodologies used to develop the MFL criteria, and those comments that are more editorial in nature. Please understand that there is probably some overlap between the two categories.

As you know we have other concerns related to the Loxahatchee River, which are not reflected in the attached comments. We appreciate the opportunity to continue our discussions regarding:

- the use of multiple levels when establishing MFLs,
- the role of MFLs to help achieve restoration,
- the role of reservations in restoring the river,
- establishing restoration targets for the river,
- the role of CERP in providing restoration to the river, and
- the relationship between consumptive uses in the basin and the MFL.

If you have any questions or would like to discuss the attached comments further, please contact me at 850-245-8681.

Sincerely,

Kathleen P. Greenwood  
Government Analyst II  
Office of Water Policy

Attachment

**Technical Comments on Methodology Used to Develop Loxahatchee MFL Criteria  
(July 15, 2002 Draft)**

1. Page 79, Modeling Assumptions. To use all of the contributions of the tributaries (Kitching Creek, Hobe Grove Ditch, etc) as a constant fraction of the freshwater discharge at Lainhart Dam and a constant ground water input of 40 cfs under all conditions is an unreliable assumption for the modeling effort. The amount of water contributed by groundwater should vary according to the hydrological conditions.
2. Page 84 and 86. River Vegetation Surveys. More explanation is needed regarding the non-random criteria used to select survey sites. Additionally, the District should explain why the transects were not conducted along a line perpendicular to the river which would appear to characterize the floodplain community more fully than a transect that was 25' wide and ran parallel to the river.
3. Page 86, Soil Salinity Surveys. Soil sample transects should have corresponded with vegetative transects or a vegetative survey should have been conducted along the soil sample transects.
4. Page 98. Table 24 and Figure 19 provide a comparison of both "historical" and more "current" flow conditions over the Lainhart dam. Without any explanation, historical conditions are defined as time period from 1977 through 1989, and current conditions are defined as 1990 through 2001. The proposed MFL criteria goes on to identifying "historical" operations as those average 1977 through 1989 flows provided by Table 24. It is not clear how the historical and current time periods were selected, or justified for the comparison. Nor is it clear why the G-92 installation date (1987) was not selected for the comparison purposes when comparing the "historical" data to that of the more recent data.
5. Page 98. Table 24 shows that historic flow over Lainhart was less than 35 cfs 73 times during 1990-2001. How often was the flow less than 35 cfs for more than 20 days (the proposed MFL harm criterion)? How often did this happen more than once in a six-year period (the proposed MFL significant harm criterion)? From the information found in the document, it is not really clear how the proposed MFL criteria relates to existing flow conditions.
6. Page 98, Table 24. When comparing "historical" data with "current" data for the purpose of showing that current and historical conditions are similar for low flow conditions, one need to compare periods of similar rainfall conditions. The comparison provided in Table 24 shows that the percentage of time that the flows fall below the 20 cfs and 15 cfs is approximately the same for the historical and current conditions, with the current time period having above average rainfall and the historical time period being dry. From this one should not automatically conclude that the current conditions are not degrading at the low flow rates, and that no harm has occurred.
7. Page 101, Table 25. The average historical salinity for the river and its tributaries range from 0.3 to 2.5 during times that the river experienced declines in freshwater floodplain community. Isn't it reasonable to conclude that even salinities as low as these caused harm? The aerial photograph analysis doesn't support conclusion on



**Technical Comments on Methodology Used to Develop Loxahatchee MFL Criteria  
(July 15, 2002 Draft)**

page 102, paragraph 2, that the upstream portions have been more impacted by salt water during the past decade. Additionally, the statement on page 102, contradicts other statements in the document that the impacts to the floodplain community have remained relatively stable since 1985.

8. Page 102, Soil Salinity Survey. The soil salinity in this survey was determined by analysis for conductivity and chlorides of soluble salts in the soil water. Soluble salts in the soil water resulting from salinity intrusion may not necessarily stay in the soil for long periods of time. The soluble salt levels are highly transitory with river flow, particularly if the soils are sandy soils. Therefore, salinity of soil pore water is not a good indicator of past long-term salinity effects. Additionally, the narrow scope of the survey should preclude the District from making any conclusions about the results.
9. Page 107, first paragraph. This section does not provide a reasonable estimate of the consumptive use. Appendix I presents a table (page I-7) that shows that under drought conditions (1988-1989) average flows are 41 cfs at the Lainhart dam, and estimates an increase to 55 cfs under a no pumping (no consumptive use) model run. The "5 cfs" professional estimate needs should be explained in more detail and should be linked with the modeling observations of Appendix I. Also there should be an explanation of why the proposed MFL is lower than the existing 41 cfs predicted by this model, including a discussion of the accuracy of the modeled predictions.
10. Page 113, Table 29. The reference "Tobe, et al. 1998" is not an appropriate reference for salinity tolerance of the species listed in the table. This reference is a plant identification manual and gives generalized habitat descriptions. It does not describe the salinity tolerance of the species listed in the table. Other more specific references should be found and used or the text should clearly explain that this reference provides generalized information regarding species habitat.
11. Page 134, Species Selected. While the District makes a reasonable argument for excluding herbaceous and canopy species from the Valued Ecosystem Community analysis, it appears to be too limiting. The canopy species could be included as an indicator of the very long-term conditions, while the herbaceous species could be included as an indicator of short-term conditions. All strata should have been analyzed during the vegetation surveys to give a more complete picture of health of the river's plant communities. A more detailed study that includes a larger assortment of species is needed. Additionally, as the District refines the MFL analysis of the other segments of the ecosystem need to be done including the benthic invertebrate and vertebrate populations.
12. Pages 136-141. Application of Modeling Tools. Throughout this section it is not clear why an average salinity of 2 ppt was chosen. The analysis shown in Figure 32 appears not to be average salinities but discrete salinity values. Table 34 shows the average salinities derived from Figure 32. The entire section seems misleading and implies that river mile 10.2 experienced an average salinity of 2 ppt, when the analysis shows average salinities were estimated at 0.154 ppt. From Table 34 it

**Technical Comments on Methodology Used to Develop Loxahatchee MFL Criteria  
(July 15, 2002 Draft)**

appears that the section of the river experiencing an average salinity of 2 ppt, was somewhere between River Mile 8.9 and 8.6. It appears that many different statistics were combined to form the MFL without an adequate explanation. The flows were derived from the one model, while the duration and frequency were derived from an entirely different analysis.

13. Pages 136-141. Salinity Threshold. The document mentions that “a numbers of previous authors have identified the 2 ppt threshold as being an effective indicator of saltwater contamination because this concentration is significantly higher than background concentrations of salts ...”. The authors also presented evidence that salinities of 2 ppt may not kill established cypress tress. We believe the salinity threshold should instead be based on protecting the six valued ecosystem component species (pond apple, dahoon holly, red maple, red bay, pop ash, and Virginia willow) since they are more sensitive to salinity than bald cypress (Page 113). Evidence presented in the report showed that these six taxa were classified as strictly freshwater taxa, suggesting that adverse effects to these taxa would occur at even 1 ppt. Therefore, we believe that the MFL model should use 1 ppt instead of 2 ppt when considering significant harm.
14. Page 140, Table 37. From table 34, the model results indicate that the average salinity at river mile 10.2 was 0.154 ppt. Yet to determine a flow regime to mimic the salinity depicted in Figure 32, the District uses an average salinity of 2 ppt. When determining the appropriate flow from table 37 to maintain mean salinity levels, why was a mean salinity of 2 ppt used instead of 0.154 ppt?
15. Page 138, Table 35 and page 145, Table 40. There was some confusion regarding which duration and frequency data were used in the model. The results produced by the 30-year model simulation show that at RM 10.2, salinities above 2 ppt occurred for 22 days every 2157 days (5.9 years) in the last 30 years. Solely based on this result, the document defines the salinity threshold (2 ppt), duration (20 days), and frequency (once every six years) to set the minimum flow for RM 9.2. However, we feel the technical support for the duration and frequency defined is not adequate. The document refers to Table 40 to set the minimum flow of 35 cfs. In Table 40, however, a category for 2 ppt and 30 days/4 years is defined, but a duration and frequency category of 20 days/6 years is not found. Which is the correct model input?
16. Pages 146-149. What will be the effect of the proposed MFL on the frequency, duration, and flooding of the swamp floodplain community? Most of the analysis focuses on moving the salinity wedge within the river's channel, but does not appear to take into account the certain hydrological requirements of the VEC community within the floodplain. Can the District provide an analysis of the effect of the proposed MFL on the frequency, duration, and depth of inundation to the floodplain?
17. Page 148, Proposed Minimum Flow Criteria. It appears that the proposed criteria could allow multiple instances where the flow could go very low, even to zero, during a single year and the MFL would not be considered violated. For instance, you could

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have 20 consecutive days of flow under 35 cfs (as low as 0) followed by a day (it could be less) of flow of at least 35 cfs. If this cycle is repeated throughout the year it implies that the river could get no more than 35 cfs for 18 days a year (4.9% of the time) and still meet the criteria. We understand that this is not the intent of the criteria, and suggest that it be rewritten to avoid this misinterpretation.

18. Page 148, Proposed Minimum Flow Criteria. While the approach to recreate salinity conditions found at an apparently healthy section of the river further downstream appears to be reasonable, the criteria used to describe this condition does not appear to adequately describe the conditions. For instance, the salinity results indicate that salinities above 3 ppt. did not occur at river mile 10.2, yet the proposed MFL criteria could allow salinities to exceed 3 ppt for 20 consecutive days, which would seem to cause significant harm.
19. Appendix E, pages E-22 and E-23. When comparing the real time salinity data with the model run predictions it appears that the model is much more influenced by tidal fluctuations (influence of the inlet), than what was observed in the real time data. During low flow conditions, the model continuously shows salinity variations of the order of 10 ppt whereas the real time data shows variations of the order of 2 to 3 ppt (Figures 2 and 3). There needs to be a discussion on the reasons for these observed salinity range variations, why the predicted fluctuations are so much greater in the model run, than what was observed in the field data, and how these variations are accounted for when selecting the MFL. How much of these variations are due to the fact that the hydrodynamic salinity model does not consider the groundwater influence and fluctuations?
20. Appendix O. Based on a review of Tables O-1 and O-3, it appears there was approximately a 30,000 acre-feet/year increase in urban water supply demands between 1995 and 1999. Is this correct? Table O-4 indicates a total **allocation** of 58,081 acre-feet/year for 1999, whereas Table O-3 indicates a total **demand** of 58,081 acre-feet/year.

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1. Page iii, fourth paragraph. While lack of data may be an appropriate reason for not establishing a MFL for the North Fork of the Loxahatchee River, the inability to regulate flow from the North Fork is not an adequate reason to not establish a MFL for the North Fork. Additionally, the highly altered nature of the Southwest Fork is not an appropriate reason for not establishing an MFL. If either of these two water bodies is expected to be harmed from withdrawals, then a MFL should be established.
2. Page 1, third line from bottom. Replace "and" with "can."
3. Page 1, last paragraph. This is the only place in the document that refers to "periodic large volume fresh water flows" that impact the resource. Does the District know the impacts of the large volume flows? If not, does the District plan to evaluate the impacts of these flows and take appropriate management actions?
4. Page 5, Figure 1. This figure indicates that reservations are only in effect for hydrologic conditions less severe than a 1-in10 drought event. Please revise this drawing to show that reservations will be implemented during all hydrologic conditions.
5. Page 10, third paragraph. This paragraph should also include a reference to the *Proposed Restoration Vision for the Northwest Fork of the Loxahatchee River* as developed jointly by DEP and SFWMD.
6. Page 12, Figure 4. The figure should include rainfall for year 2001 (also noted that x axis labeling is off for the 2000 mark).
7. Page 16, second paragraph. The Loxahatchee River has never been designated a State Wild and Scenic River.
8. Page 17, Table 1, and Page 97, Table 23. Please provide summary of average wet season and dry season flows that occurred during the 1971 and 1999-2001 drought periods. While the tables reflect that an average of 70 cfs flows to the Loxahatchee Estuary during the dry season for the period of record, the statistical medians and modes of the flow events discharging through the Northwest Fork of the Loxahatchee River should also be provided (i.e. how many days of 0 cfs events).
9. Page 17, Table 1. This table indicates an average daily dry season flow of 70 cfs over the Lainhart Dam. Coupled with other tributary flows a total of 125 cfs is provided to the river during the dry season. These are average conditions and flows may fall to 10 cfs or lower. Similarly, wet season average flows are 185 cfs but frequently exceed this during the wet season. Nevertheless, the dry season/drought conditions are the primary concern, which points out the need for better water management and storage facilities to reduce excess high flows so the average actually occurs during droughts.
10. Page 22, Drainage Alterations. This section indicates that the Loxahatchee basin has declined from 270 to 210 square miles, yet page 13 of the document indicates that the

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size of the basin has declined from 250 to 200 square miles. Please correct the discrepancy.

11. Page 26 - 27. The document notes that the largest oysters occur between river mile 4.0 and 6.0. Historically, where were the most productive oyster areas?
12. Page 32, third paragraph. The Hobe Grove Ditch was dug to the Loxahatchee River in the late 1960s. Sod farming has been a more recent agricultural change. The Chinese vegetable farm was operating years before sod farming was undertaken.
13. Page 34, second paragraph, and page 79. The 1973 USGS document by Harry Rodis concluded that a continuous flow of 50 cfs would only to protect the middle reaches of the river within the park, which only extends downstream to the Trapper Nelson Interpretive Site. The MFL technical document should more clearly describe the USGS report conclusions.
14. Page 43, Overview of Consumptive Uses Within the Watershed. What is meant by the term "combined average annual allocation?" Is this number the sum of all allocations divided by the number of permits? Instead, please provide the total annual allocation in the basin.
15. Page 44, Figure 10-A. Should "groundwater" be labeled as "surficial aquifer?" It is confusing to have "groundwater" labeled separately from "Floridan aquifer" unless a different aquifer is being used.
16. Page 44, first paragraph. This section notes that reclaimed water is disposed of in the wet season. Assuming water quality concerns could be met, what is the feasibility of storing this water for supplementing flows to the river during the dry season?
17. Page 59, Water Resource Functions Protected by MFL. This section indicates that water supply and flood protection are functions that should be protected by an MFL. The MFL is established to protect the water resource from significant harm, so the District can know what amount of water can be used for water supply or what effects the MFL will have on flood protection. The "water supply" and "drainage and flood protection" bullets should be removed from the list of items cited as being protected by an MFL. These are appropriate resource functions of the river and can be identified as functions, but the MFL should be established independent of these functions.
18. Page 66, Recreation. This section could benefit from including information about Jonathon Dickinson State Park's (JDSP) contribution to the local economy. JDSP encompasses 11,480 acres and attracts 169,768 visitors annually (1999-00), largely because of the Loxahatchee River and recreation that depends on it. According to research conducted by FSP, the total direct economic impact of JDSP on the local community is \$5,101,443 annually. Deterioration of the ecology and aesthetics of the river are serious concerns that affect tourists and the local community.



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19. Page 66, Recreation. This section should also include a description of the statutory responsibility of Florida State Parks when managing the JDSP. The DEP is compelled by Florida Statute 258.037 to establish a policy "to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them..."
20. Page 68, last paragraphs. One paragraph indicates that there is no detailed information on the role of groundwater providing base flows to the Loxahatchee, yet the next paragraph indicates that the effects of consumptive use permits are not very large. Additionally, on page 81, the document indicates that many of the data records reporting actual pumpage values from permit holders were missing or incomplete. It is difficult to understand how the report concludes that consumptive uses have little or no impact on the groundwater flows to the river, when little is known about the influence of groundwater on base flows to the river. The possibility remains that alternative sources may need to be developed for users to eliminate withdrawals that are indeed affecting river flow.
21. Pages 69-71, Consideration and Exclusions. The various references to water supply throughout this section implies that the effects of consumptive uses can be taken into consideration by the Governing Board when considering the effects of alterations pursuant to Section 373.042 (1)(a). While it is appropriate to identify these as functions of the waterbody, the water supply functions are not to be taken into account when establishing the MFL. Once the MFL is established, maintaining current water supply should not be included when determining the MFL. The statute explicitly prohibits allowing significant harm caused by withdrawals and the discussion in this section should include that statement. Water supply considerations can be factored into the recovery and prevention strategy, not the MFL establishment.
22. Page 69, first sentence and Page 107. The sentence on page 69 regarding monitoring of consumptive uses indicates that monitoring is conducted to prevent any decline in groundwater available to the river. This contradicts the statement on Page 107, which states that dry season impacts on flows are less than 5 cfs. Please clarify whether flows are impacted by groundwater withdrawals.
23. Pages 72-73, Exclusions. This section is confusing and could use some clarification. This section should clearly describe that the district is going to consider the effects of structural alterations to the water resource, except those associated with consumptive uses, as allowed pursuant to Section 373.042(1)(a). The District should provide more explanation about the provisions of 373.042(1)(b), which allows the District in certain situations not to establish MFL for certain waterbodies. This section would benefit from a summary statement that indicates that the District is going to consider the structural effects to the river but is still going to establish a MFL for the river.

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24. Page 77, Table 15. The comparison table of river miles from different reports is helpful, but a better map with some specific locations would assist the reader.
25. Page 79. Why wasn't the data on sub-basin freshwater inflows reported in the Kitching Creek Study (conducted by Martin County and Florida State Parks) included in the development of the MFL criteria?
26. Page 80, first paragraph. This section indicated that long term salinity records were not available for the river at the vegetation survey sites. The document should describe the salinity records that were available.
27. Page 81, Documentation of Historic Water Use Within the Loxahatchee Basin. Is it possible for the District to provide the total amount of water permitted for withdrawal and the amount that is actually withdrawn within the Loxahatchee Watershed?
28. Page 83. According to the "Vascular Plants of Jonathan Dickinson State Park", sweet gum (*Liquidambar styraciflua*) is not found along the Northwest Fork.
29. Page 87, second paragraph. We think that estimating the amount of water that flowed from the watershed prior to development is relevant to developing a MFL and restoration targets. It is important to better understand how much water originally drove the system; a predevelopment water budget should be estimated.
30. Page 96, last sentence. MFLs are not simply to be maintained during conditions associated with regional drought. Low flow conditions may also be caused by overuse of the resource that could be occurring during average or wet conditions. This sentence implies that MFLs will only be in effect during droughts and should be deleted.
31. Page 97, Table 23. The data presented in the table does not correspond to the data collected by USGS and used in the Russell and McPherson report as referenced.
32. Page 98. Table 24 shows the historical record extends back to 1971. Has the District's research uncovered any earlier data on flows or levels in the Northwest Fork? Can this data be used?
33. Page 105, bullets 3 and 4, and Figure 22. The bullets indicate that only 2 permits authorize withdrawals showing greater than 0.1' drawdown, and only 4 permits authorize drawdowns greater than 0.1' drawdown in C-18 canal. Yet, Figure 22 shows more than 6 points of groundwater allocations with greater than 0.1' drawdown. This discrepancy should be explained in the document.
34. Page 106, Effects of Water Use. This section describes the singular effect of the various uses in the basin, but does not describe the cumulative effect of all these withdrawal points. This section should include a summary of a cumulative analysis of the withdrawals.



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35. Page 106, Effects of Water Use. It would be helpful if the District provided information about the timing of withdrawals. Can the district show the amount of withdrawals that occurred during wet, average, dry, and extremely dry conditions? While the District notes that average flows at Lainhart Dam has increased (p. 140), it is also curious to note that during the same period, extreme low flows (< 10 cfs) increased by approximately 10%.
36. Page 112, Table 27. Many scientific names were misspelled in this table, please correct. Additionally, no mangrove species are listed in this table. Weren't these species counted and measured as part of the vegetative transects? They should have been present in the transects located downstream of river mile 9.
37. Page 115. The district should describe the difference between seedlings and saplings or provide definitions in the glossary.
38. Page 119, second paragraph. The coastal hammock community does not occur along the river, however there are hydric hammocks and one tropical hammock (see Jonathon Dickinson State Park's Unit Management Plan).
39. Page 121, second paragraph. Cabbage palms commonly occur in both upland and wetland habitats and are usually a dominant component of hydric hammocks. Please revise the statement that indicates cabbage palms are "normally" associated with upland communities.
40. Page 122, last paragraph, and page 132. The information used to reach the conclusion that vegetation has stabilized since 1985 seems to be based upon very limited information. It is quite possible that the decline is slight, but continued especially since there is no information on the health of the VEC community or the impacts to seedling germination and survival. The information presented seems to only support the conclusion that changes in the extent of cypress trees seem to have stabilized. As was noted earlier in the report, the canopy species may take longer to respond to stress than the rest of the floodplain community particularly the VEC community.
41. Page 125, Figure 29. From this analysis it appears that the construction of the C-18 canal had a much greater impact on the riverine community than the opening of the inlet.
42. Page 139, Table 36. The Ds and Db in Table 36 for sites 9B, 9C and 10B are much different from those in Table H-4 in Appendix H.
43. Page 139, third paragraph: The verbs should be in the past tense.
44. Page 140, 2nd Bullet. The dry season flows should also be provided here.
45. Page 148. Please explain how the proposed MFL criteria relates to the Stipulation for Consent Decree (Case No. 79-1910 CA (L) 01 C) between the Florida Wildlife

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Federation and the South Florida Water Management District and the Florida Department of Environmental Regulation (now DEP).

46. Page 148. Harm Criteria. If flows at Lainhart falls below 35 cfs for more than 20 days, the MFL criteria will be exceeded and “harm” will occur to the floodplain. What resulting actions will the WMD take? If this happens more than once every six years, significant harm and an MFL violation occur. What resulting actions will the WMD take?
47. Page 153, paragraph preceding bulleted list. This paragraph indicates that 1984 was the year the NW Fork was designated a Wild and Scenic River, yet the rest of the document indicates 1985 was the year the river was designated as a Wild and Scenic River. Please clarify this contradiction.
48. Page 153, Management Targets. This section refers to a flow of 65 cfs, but does not provide a duration or frequency component, which results in a meaningless value. What exactly is meant by “providing 65 cfs flow whenever possible” and how will this affect the salinity along various sections of the river? To which point along the river will this flow target push the freshwater/saltwater interface? How long and how often is this expected to occur? It is premature to cite 65 cfs as a management target when the DEP and the District are in the process of determining appropriate restoration flows. Furthermore, care should be used within the document to indicate that this management target is not proposed as a reservation or the ultimate restoration goal for the river.
49. Page 153, Management Targets. The selection of 1985 as a baseline to determine management targets for the river, seems to have been arbitrarily selected. More explanation is needed to distinguish Management Targets from the MFL and restoration goals, if they are different. Since the vast majority of the damage to this river occurred prior to this date, and the mangrove encroachment has not substantially changed since 1985, setting 1985 as a baseline condition does not provide for meaningful restoration of the flow to the river.
50. Page 153, paragraph preceding the bottom bullets. The three management targets proposed are too limiting and does not include the scenario that allows for recovery of historical cypress community that has experienced significant harm. It is unclear how these targets relate to restoration goals and the MFL.
51. Pages 154 – 156, Phased Recovery Plan. The MFL phased recovery plan is based on implementation of projects identified in the NPBCCWMP and the Comprehensive Everglades Restoration Plan. The Loxahatchee River, an Outstanding Florida Water body, is afforded the highest protection pursuant to 62-302.700, Florida Administrative Code. As such, no degradation of water quality is permitted and all discharges to the Loxahatchee River shall meet state water quality standards. In addition, project components of CERP, pursuant to 373.1502(3)(B)(2), F.S., (Comprehensive Everglades Restoration Plan Recovery Act) shall not contribute to violations of the state water quality standards.

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52. Page 154, Recovery Plan. The plan needs more detailed explanation of how the proposed projects tie in with the recovery goals, so that we can better evaluate the plan. Many of the projects provide flood protection and water supply benefits and it is not clear how much these projects contribute to improving flows to the river. Is it possible to expedite critical projects that provide critical storage needs (such as installation of the G160 structure)?
53. Page 160, Operational Protocols. In the second paragraph it states that the District will continue to provide a flow of 50 cfs or greater over the Lainhart Dam while in the management target is stated as 65 cfs or greater. Please clarify this discrepancy.
54. Page 165, River Restoration. Please provide more details, including the action steps that specifically describe how this will occur. Additionally, details are needed that ensure appropriate restoration targets will be included as CERP projects are designed and developed.
55. Page 165, Estuarine Research. This section correctly notes the need to determine the effects of the proposed MFL on various components of the Estuary. Additionally, the section should note that the MFL will be revised as these studies are completed.
56. Page 165, Salinity Barrier Feasibility Analysis. For your information, several meetings were held, in 1975, and drawings were completed regarding this proposed structure. Except for the final design, this information is available at the District 5 Administration Office Florida State Parks.
57. Pages 166-168. The District should provide more details regarding this research effort including time lines for accomplishing each task, estimated costs, and funding sources.
58. Table of Contents. This needs to be correlated/updated with correct references to page numbers.
59. Appendices. The references to main document figures need to be correlated/updated (example B-14 make reference to Figures 2 of main report, which probably should have referenced Figure 4).
60. Appendix A, Page A-7. Duever's referenced Figures A-1 and A-2 were not included.
61. Appendix I. Due to the "gross estimates" that this model generates, the calibration error of less than 10 CFS during 55 percent of the simulation period, the constant contributions assumed from each tributary, and the use of averages instead of extreme conditions, the value of 9 CFS proposed does not seem to be representative of what the actual effects could be.
62. Appendix O, Table O-3. This table shows that 32,961 MGD/year of water usage in the Loxahatchee watershed. This equates ( $32,961 \times 1.55$  divided by 365 = 139.9) to 140 cfs of daily watershed flow. The majority of this water usage is for urban water

## Specific/Editorial Comments (July 15, 2002 Draft)

supply of which most (63 percent) comes from groundwater. Although this flow may not be important in the wet season, it probably is a significant contributor to base flows during the dry season. As the dry season flows are the primary issue, it seems that existing and future water allocations could continue to reduce groundwater flows to the river unless water conservation practices, desalinization, or reuse reduce demand. Again, it also points out the need for improved water management and storage facilities to extend the hydroperiod during the dry season.

63. The document may be improved by some reorganization and elimination of redundancy.

- a. Chapter 2 and Chapter 3 should be combined. After the description of an aspect of the water body, immediately discuss the resource functions and considerations related to that aspect. In this way, some descriptions in Chapter 2 that are not important related to the MFL and recovery issues could be eliminated. Some repeated information and statements in Chapter 3 could also be deleted.
- b. Chapter 4 and Chapter 5 would also be better combined, following the same logic in the above comment. Combining chapters would allow repeated information and statements to be eliminated, and readers could more easily find the connection between the results and the methods.
- c. Chapter 4 and Chapter 5 would be improved if they were rewritten according to the criteria for establishing the MFL. In the current document, readers cannot easily find the information about where and how each element (criterion) of the MFL is determined. It would be better to have a specific, clear and logical description about how each element (criterion) of MFL is determined, in the following sequence:
  - baseline time (year) to establish MFL
  - indicators (Valued Ecosystem Components)
  - location (river miles) of significant harm
  - location of the flow measuring point
  - salinity threshold
  - maximum duration and frequency
  - threshold flow rate.

64. The following (underlined>) may be errors:

- Page 57, first paragraph: "...in all the of the other subbasins."
- Page 86, second paragraph: "...in Table 29 were measured..."
- Page 91, second paragraph: "Once the water resource... and specific technical... water body."
- Page 93, third paragraph: "See also Table 22 of this report."
- Page 115, third paragraph: "...the majority the six VEC species..."
- Page 116, third paragraph: "...significant harm (Table 31)."
- Page 138, third paragraph: "...during 12% of of the simulation..."

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- Page 142, the footnote of Table 38: "...vegetation parameter (Ds/Db) was observed..."
- Page 144, second paragraph: "...up to 2 ppt (Figure 30)."
- Page 146, second paragraph: "(river mile 9.2)(Table 35)."
- Page 153, second paragraph: "...in 1984, at the time..."



## SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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**RES 10-12**

November 4, 2002

The Honorable Geraldine Genco  
Mayor, Village of Tequesta  
P.O. Box 3273  
Tequesta, FL 33469-0273

**Subject: Resolution No. 67-01/02 – Opposing the Loxahatchee River MFL**

Mayor and Council Members:

District staff has reviewed Village Resolution No. 67-01/02 opposing the 35-cfs minimum flow and level (MFL) proposed for the Loxahatchee River and the need to also include seasonal flow criteria for the river. We are not clear what specific information was provided to the Council prior to the vote, but the District would like to provide each councilperson with the following background information:

### **Basis of the Proposed MFL Criteria**

1. The Loxahatchee watershed represents a highly altered ecosystem. Permanent opening of the Jupiter Inlet in 1947 now exposes the lower portion of the river to the daily tidal regime. Construction of the C-18 canal to provide flood protection for the Jupiter/Tequesta area has drained the Loxahatchee Slough (the headwaters of the river) resulting in a loss of over 8,000 acre feet of storage within the watershed.
2. Resource problems occur within the NW Fork of the Loxahatchee River primarily during the dry season when Lainhart Dam flows drop below 35 cfs and allows saltwater to penetrate upstream of river mile 9 impacting remaining freshwater vegetation communities. During extreme drought conditions, these flows may reach zero and allow saltwater to move as far upstream as Trapper Nelson's (river mile 10.7).
3. The proposed minimum flow criteria were developed to prevent significant harm to water resources of ecology of the area as provided in *Chapter 373.042(1) F.S.* To prevent further damage to these freshwater communities, the District has proposed a minimum flow of 35 cfs (as measured at the Lainhart Dam) which can not be exceeded more than 20 days duration, more often than once every 6 years. Under current conditions (1990-2001) the river fell below 35 cfs 11 out of 12 years for total of 1,081 days (about 3 years in total). The proposed MFL would greatly improve this condition.
4. It should also be understood that during the dry season a minimum flow of 35 cfs provided by the Lainhart Dam equates to about 30 cfs discharged from Cypress Creek, 7 cfs from Hobe Grove Ditch, and 5 cfs from Kitching Creek, for a total flow of 77 cfs delivered to the river during the dry season.

#### GOVERNING BOARD

Trudi K. Williams, P.E., *Chair*  
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Harkley R. Thornton

#### EXECUTIVE OFFICE

Henry Dean, *Executive Director*



5. The District has an existing agreement (1982 Consent Agreement) to provide at least 50 cfs of flow to the river as measured at the Lainhart Dam when available. These water deliveries will continue, even after the MFL is adopted.
6. SFWMD staff have been working with the Florida Department of Environmental Protection (FDEP), Jonathan Dickinson State Park (JDSP), the Loxahatchee River Management Coordinating Council, and members of the public over the past two years to develop a MFL for the NW Fork of the Loxahatchee River. Due to concerns about new development proposed within the Loxahatchee watershed, there is general agreement that an initial MFL needs to be established for the river as soon as possible for consideration in the District's consumptive use permitting process.

#### **MFL Recovery Plan**

1. To meet the proposed MFL, the District has developed a MFL Recovery Plan designed to immediately increase water storage within the basin to meet the proposed MFL criteria by 2006. Key projects currently underway include: construction of the Loxahatchee Slough Structure (\$2.7 million) to capture and store water in the slough for later delivery to the river during the dry season; widening the M-canal and constructing the C-2 pump station (\$3.0 million) to provide flows from the L-8 canal when available; and construction of a flowway under Northlake Boulevard (\$1.2 million) to provide flows from the West Palm Beach Water Catchment Area to the headwaters of the Loxahatchee River.
2. As part of the Northern Palm Beach County Comprehensive Water Management Plan (NPBCCWMP), the District has committed over \$39 million for water conveyance and water storage projects over the next 14 years to reconnect the regional system with the headwaters of the Loxahatchee River. Construction of these projects will provide a target flow of 65 cfs to the NW Fork of the river by 2018.
3. The District recognizes that the proposed MFL represents only a partial solution to the problems that exist within the Loxahatchee watershed. As defined in state statutes, MFL criteria are only intended to protect the resource from significant harm. Restoration of the river will be accomplished as outlined on page 3 of this letter.

#### **Seasonal Flow Criteria**

District staff examined seasonal variations in flow to the river as part of the MFL analysis. A seasonal variation component to the MFL for the Loxahatchee River was not considered to be appropriate because of the following considerations:

1. Average flows (about 100 cfs) and typical peak flows (as much as 700 cfs) to the river, tend to follow normal seasonal rainfall patterns and seem to be appropriate to protect existing resources in the watershed.
2. As discussed previously, the primary problem that impacts the river are low flow events experienced during the dry season and during extended droughts. Extended dry periods allow saltwater to encroach up river and cause harm to water resources.
3. There is little evidence indicating that wet season flows, or flows that occur at any other time of year (other than the dry season) are currently impacting the resource due to an existing facility, water withdrawal or water management practice.
4. Establishing a seasonally based MFL, although suggested as an option by Chapter 373.042(1) F.S. is inconsistent with established District policy for other water bodies, including the greater Everglades, Lake Okeechobee, Caloosahatchee River and Estuary and the St. Lucie



River and Estuary. Seasonally based flow targets for these areas are being addressed through restoration plans.

### **River Restoration Efforts**

1. SFWMD staff is also actively engaged with the FDEP, other agencies, local government and the public, to develop an achievable restoration goal for the river and estuary. The District has committed substantial technical staff and resources to develop seasonally managed flow criteria for the river as part of the restoration process. This work is already underway and is viewed by the District as the appropriate vehicle to develop seasonal flow criteria for the river.
2. The District is also working with the USACE to address the environmental restoration needs of the Loxahatchee watershed as part of the regional Comprehensive Everglades Restoration planning (CERP) process. As part of CERP, the District and USACE are developing the Northern Palm Beach County Project Implementation Report (PIR). The PIR identifies a number of key projects that will provide increased storage within the basin that will provide more water for the NW Fork of the Loxahatchee River. These projects include: construction of the L-8 reservoir which will add 48,000 ac-ft of storage to the basin, C-18 basin storage, C-51/C-17 back pumping and treatment, and Pal Mar/Corbett land acquisition and hydroperiod enhancement.
3. A major outcome of this planning effort will be a more complete set of seasonally managed flow criteria for the river that are driven by natural rainfall patterns. As part of that process, the District will expand the watershed modeling effort to include the entire Loxahatchee watershed (including Martin County).
4. MFL criteria for the river will be revisited after restoration goals and seasonal flow criteria have been defined and a water reservation for the river has been established. The CERP restoration process is viewed by the District as the appropriate process to address restoration needs of the system and seasonal flow characteristics of the river. Once identified, the restoration flow targets will be used in the CERP project design and the water reserved for the river on a project by project basis.

Based on the information provided above, we urge the Village Council to reconsider resolution No. 67-01/02, which opposes implementation of the MFL rule for the Loxahatchee River. Additionally we would look forward to meeting with you personally, to discuss any outstanding issues you may have associated with the Loxahatchee River. Thank you for your continued interest in the water resources of South Florida.

Sincerely,



Kenneth G. Ammon, P.E.

Director

Water Supply Department

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PLEASE REPLY TO: Treasure Coast Office

November 13, 2002

Mr. John Zahina  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33408

RE: Loxahatchee MFL comments

Dear John,

Let me first apologize for the delay in providing you with these written comments on the draft technical criteria for the establishment of a minimum flow and level for the Loxahatchee River, submitted on behalf of the Florida Wildlife Federation, the Sierra Club Loxahatchee Group, and the Martin County Conservation Alliance. I am confident, however, that the issues raised in these comments will not be new to you, as we have voiced the majority of these concerns at numerous public meetings on the subject. While these comments are directed to the July 2002 draft technical criteria, I believe many of the issues here raised will also apply to the soon to be released November draft technical criteria. I understand that release of the November draft is imminent, and so as not to delay your process, I would ask that you keep these comments in mind when considering revisions to that document. Likewise, we will supplement or revise these comments in response to our review of the November draft technical criteria.

Our primary concerns at this point relate to the extremely short timeframe (less than 1 month) proposed for the rule development process. Given the highly complex nature of an MFL rule and the significant public interest in protecting and enhancing the Loxahatchee River, it would appear that additional time for stakeholder analysis of the revised technical criteria would be warranted.

We are additionally concerned that the proposed MFL exceedence and violation criteria and return frequency are not sufficient to protect the river from significant harm. As currently worded, the proposed MFL criteria would allow repetitive or long term low flow or zero flow events, the effects of which have not been analyzed in the technical criteria. We recommend revising the exceedence and violation criteria to prevent such an outcome.

We are unconvinced that 1985 represents an appropriate baseline condition for establishment of the MFL. The state's interest in protecting and restoring the Loxahatchee was evident well before 1985, and numerous scientific studies from that time document the damage that had already been caused by reduction of flows to the river. We urge the District to select an earlier baseline which more accurately reflects the longstanding state and federal interest in protecting and enhancing the historical conditions of the river and watershed.

It is also disappointing to see that MFL's have not been established for the Loxahatchee Slough, or for any of the tributaries to the Northwest Fork. Failure to establish tributary MFL's will allow significant harm to continue to occur on the River, particularly to the currently healthy cypress swamp existing at Kitching Creek.

Finally, we believe it is critical that the MFL, once established, be reviewed earlier than in 5 years. We recommend that the District commit to reviewing the MFL by no later than 2004, concurrent with the proposed schedule for establishment of an initial reservation to protect existing water for the protection of fish and wildlife and with the scheduled completion of the Northern Palm Beach County Project Implementation Report.

Thank you for consideration of our comments. As always, we are available to meet with District staff to address these concerns in greater detail.

Sincerely,

Lisa Interlandi

cc: Henry Dean, SFWMD  
Dave Swift, SFWMD  
Joel VanArnum, SFWMD  
Ken Ammon, SFWMD  
Scott Burns, SFWMD  
Cecile Ross, SFWMD  
Melissa Meeker, FDEP  
David Struhs, FDEP  
Manley Fuller, FWF  
Kay Gates, Lox Sierra  
Donna Melzer, MCCA  
Nathaniel P. Reed

The Environmental & Land Use Law Center submits the following comments on behalf of the Florida Wildlife Federation, the Sierra Club Loxahatchee Group, and the Martin County Conservation Alliance regarding the July Draft Loxahatchee River MFL Technical document and proposed rule. These comments are preliminary in nature, and will be revised and / or supplemented as rule development proceeds.

#### **TIMING FOR RULE DEVELOPMENT PROCESS**

Our initial concern is that the proposed rule development schedule is extremely aggressive, and does not provide sufficient opportunity for public input, does not allow sufficient time for stakeholder review between mail out of the final draft MFL technical document (November 15<sup>th</sup>) and rule development workshops (November 19<sup>th</sup> and 25<sup>th</sup>) and final Governing Board approval (December).

**Recommendation:** Revise rule development schedule to allow sufficient time for stakeholder review of final draft rule prior to rule development workshops. Increase opportunities for public participation in rule development by scheduling an at least one additional full day public workshop on the proposed rule.

#### **MFL CRITERIA AND RETURN FREQUENCY**

Under the proposed rule, an MFL violation occurs within the Northwest Fork of the Loxahatchee River when an exceedance occurs more than once every six years. An “exceedance” is defined as when flows to the Northwest Fork of the river as measured over Lainhart Dam decline below 35 cfs for more than 20 consecutive days within any given calendar year.

The proposed definition of “exceedance” is loosely worded and as drafted is insufficient to prevent significant harm. While not suggesting that the District would employ such an operational strategy, as an example, the proposed rule would allow unlimited cycling of 19 days of less than 35 cfs (or even zero flow), followed by 1 day of 35 cfs, without ever triggering an exceedance, which would result in a substantial reduction in overall flows to the River.

While such an example appears somewhat extreme and unlikely, less extreme examples would be more likely to occur, but were not analyzed by the technical criteria and could be equally damaging to the river.

Also, due to the 1 in 6 years return frequency, once an exceedance (< 35 cfs for >20 days) has occurred, lower than 35 cfs flows could continue consecutively for up to 1 year without triggering an MFL violation.

The technical criteria fails to analyze the impact that numerous, repetitive, or long term low flow or zero flow events, as would be allowed under the proposed technical criteria, could have on the river.

Additionally, by establishing a single numerical minimum flow, the proposed MFL fails to account for natural seasonal fluctuations in water flows or levels, as required by Rule 62-40.473 F.A.C. which states:

*“(1) In establishing minimum flows and levels pursuant to Section 373.042, consideration shall be given to the protection of water resources, natural seasonal fluctuations in water flows or levels, and environmental values associated with coastal, estuarine, aquatic, and wetlands ecology. . .”*

Page 68 of the technical criteria acknowledges that “Protection of this resource requires reducing or reversing the current trend of saltwater intrusion and mangrove invasion within the upstream freshwater portion of the river by maintaining minimum baseline freshwater flows to the Northwest Fork.” This statement appears to be contradicted by the proposed MFL of 35 cfs. The MFL as proposed does not reduce or reverse the damage that has been caused by decades of neglect and oversight.

The proposed MFL appears to adopt the strategy of maintaining the status quo, although due to the problems with the return frequency, definition of exceedance, etc. detailed above, it is unlikely that the proposed MFL would in fact maintain the status quo, as it would appear to allow a significant reduction in current flows.

As has been suggested by FDEP staff, if the status quo is to be maintained, current flow conditions cannot be allowed to deteriorate --an MFL to protect the status quo should include a range of flow requirements similar to those in Table 40 on page 145 and include flows from page 139. Flows at Lainhart Dam should average 50 cfs annually, not fall below 35 cfs for more than 40 days once a year, fall to 20 cfs once every 1.67 years and for no more than 30 days, fall to 10 cfs every 6 years and for no more than 20 days, and fall to 5 cfs for no more than 13 days once every 30 years, and never fall below 5 cfs. Such an MFL could best be administered by developing a rainfall formula to meet its requirements.

We, however, disagree that a strategy of maintaining the status quo is appropriate for establishment of an MFL for the Loxahatchee River, as we believe such an approach would conflict with the non-degradation and enhancement policy expressed by the Federal Wild and Scenic River's act, which requires that Wild and Scenic Rivers be managed to protect and enhance the values for which the River was designated, and accordingly we recommend establishment of an MFL that promotes some level (even if limited) of river restoration.

Furthermore, the consent decree between Florida Wildlife Federation and the District requires the District to provide a minimum flow of 50 cfs “when available”. There would appear to be some conflict between an MFL of 35 cfs and an accompanying recovery strategy and fulfillment of the District's obligations under this consent decree. More explanation is needed on how the District will define the phrase “when available”, and how this requirement will be implemented in the future. For instance, would the District grant a consumptive use permit if the permit was consistent with the 35 cfs recovery strategy, but



would reduce the frequency that 50 cfs is “available” under the terms of the consent decree?

**Recommendation:** Analyze impact that repetitive or long term low flow or zero flow events could have and revise MFL exceedence / violation definition or return frequency accordingly; or revise MFL exceedence / violation definition and return frequency to prevent repetitive or long term low or zero flow events.

**Recommendation:** Revise MFL to encompass a flow regime with natural seasonal fluctuations in water flows or levels, as required by Rule 62-40.473 F.A.C.

**Recommendation:** Provide further explanation about the District’s obligations under the Florida Wildlife Federation consent decree and about how these obligations will be fulfilled in application of the recovery strategy and in future permitting decisions.

### **USE OF 1985 BASE CONDITION**

Throughout the document, and particularly on P. 130, the draft technical criteria states that SFWMD staff selected the condition of the river in 1985 as the baseline or reference point for establishing the MFL. The document states that 1985 was chosen as the base condition because the Wild and Scenic River Management Plan (SFWMD, 2002) recognized the values of the river at that time and identified the need to protect and enhance these resources.

Choosing 1985 as the MFL base condition appears somewhat arbitrary, as in 1985 it had long been recognized that the Loxahatchee River was seriously threatened by reduced flows, and the need to increase flows to enhance the river condition was well documented. The Federal Wild and Scenic River’s act, itself states a non-degradation and enhancement policy, which requires that each wild and scenic river be managed to protect and enhance the values for which the river was designated. Additionally, in 1983 the District was given the rulemaking authority and direction by the legislature to establish a Loxahatchee River rule to regulate activities in the watershed which could have an adverse effect on river resources. Such a rule was never adopted, while the River’s condition has continued to deteriorate.

Concerned citizens, environmental advocates, and governmental agencies have called for the restoration of flows to the Northwest Fork of the Loxahatchee River for at least the last three decades. Similarly, it was decades ago that the SFWMD was given the responsibility to establish a MFL for the river. While over the last 30 years no MFL has been established, damaging low flows have persisted while over-drainage and development have continued unabated, further degrading the river and its cypress swamp community.

Numerous large scale studies were conducted on the river in the early 1970’s, including the 1973 United States Geologic Survey hydrologic study, which concluded that the primary cause of environmental problems facing the river was the upstream movement of salt water which had caused changes in the flora and fauna of Jonathon Dickinson State Park. The report found that land



development, canal construction, and water control practices allowed salt water to encroach upstream, and determined that a minimum of 50 c.f.s. would be required to retard further upstream movement of salt water under the drainage and development conditions that existed at the time of the study. See 1985 Management Plan, p. 21.

The state recognized the river's importance and need for protection as early at 1970 by designation of the Loxahatchee River–Lake Worth Creek Aquatic Preserve by the Governor and Cabinet, sitting as the Board of Trustees of the Internal Improvement Trust Fund. In 1975, the Legislature passed the “Florida Aquatic Preserve Act” (Chapter 258, Fla. Stat.) which directs that “submerged lands in areas which have exceptional biological, aesthetic, and scientific value, as hereinafter described, be set aside forever as aquatic preserves or sanctuaries for the benefit of future generations.” The intent of the State, through the Trustees and the Legislature, to protect, preserve, and enhance the condition of the Loxahatchee River has been evident since at least the early 1970's.

Even the 1985 Management Plan, which the technical criteria relies upon in setting the 1985 baseline, recognized that the river was in jeopardy due to low flows, and therefore increasing minimum flows was a principle goal of the plan. “Clean fresh water of sufficient quantity and periodicity is essential in maintaining the area's scenic qualities and diverse native plant communities and wildlife populations. Man-made alterations to the river's natural drainage patterns have reduced the quantity and quality of water in river, and these changes have contributed to the corresponding declines in the river's natural and scenic qualities.” 1985 Management Plan, p. 14.

A principle goal of the plan, insofar as the management of the river's water resources is concerned, is to, “increase minimum flows to the river as much as possible in order to effect the greatest possible downstream movement of the saltwater wedge during dry conditions”. 1985 Management Plan, p. 100.

Additionally, Section 373.042(1) Fla. Stat. requires the District to consider, and at its discretion provide for, the protection of non-consumptive uses in the establishment of minimum flows and levels. This provision should be utilized to ensure sufficient flows for the protection and enhancement of Jonathon Dickinson State Park, the Loxahatchee River – Lake Worth Creek Aquatic Preserve, and for the protection and enhancement of the wild and scenic river values.

**Recommendation:** Revise baseline condition for the protected resource functions of the Loxahatchee River and estuary to an earlier date which more accurately represents the longstanding state and federal interest in protecting and enhancing the historical conditions of the river and watershed.

**Recommendation:** Revise MFL to provide for the protection of non-consumptive uses pursuant to Section 373.042(1) Fla. Stat., including amounts of water necessary for the protection and enhancement of the wild and scenic values of the Loxahatchee River, and protection and enhancement of Jonathon Dickinson State Park, and the Loxahatchee River–Lake Worth Creek Aquatic Preserve. These non-consumptive uses are critical for the protection of public lands and for

Florida State Parks and should be protected by the MFL due to the immense public benefit these resources provide.

## **CONSUMPTIVE USES**

The technical criteria asserts throughout that , "...water use within the watershed does not hydrologically influence the flows in the Loxahatchee River...". Conversely, the document also acknowledges the inability to calculate the impact of consumptive use and states that "professional judgment" indicates dry season impacts to the river could be in the range of 5 cfs.

From a lay perspective, 5 cfs does not appear to be a reasonable estimate of consumptive use impacts on the river, particularly given the extensive development and numerous wellfields in and adjacent to the Loxahatchee River basin and the acknowledged uncertainties in the model and the inability of the model to link surface water and ground water flows. It was also troubling to see on page 81 that consumptive use permitting records which are necessary to determine actual dry season pumpage were examined and "many of the data records were missing or incomplete."

Assuming 5 cfs is an accurate estimate, the technical criteria inappropriately minimizes the significance of such an impact. 5 cfs is 15% of a 35 cfs MFL, which could, in fact, be significant.

The document acknowledges on p. 63 that "...very little allocable water remains from the surficial aquifer within the watershed." It is concerning that the district considers any water available for allocation in the watershed, when there is no clear answer as to how consumptive uses have impacted dry season flows to the river. The lack of allocable surficial aquifer water in the watershed calls for the district to refrain from issuing or renewing consumptive use permits from the surficial aquifer within the Loxahatchee watershed until alternative water resources are available.

**Recommendation:** Conduct a more thorough analysis of the impacts of consumptive use on flows to the river. Expedite development of integrated surface and groundwater model and to better understand impacts to the river.

**Recommendation:** Refrain from issuing or renewing consumptive use permits which draw from the surficial aquifer within the Loxahatchee watershed.

**Recommendation:** Internally audit or otherwise ensure that consumptive use pumpage records are timely submitted, complete, and available for public review.

## **LOXAHATCHEE SLOUGH AND ESTUARY**

The MFL technical criteria does not address minimum flows or levels for the Loxahatchee Slough or the Loxahatchee Estuary. Will MFL's be established for these waterbodies, and if so, when? The document is entitled Minimum Flows and Levels for the Loxahatchee River and Estuary, however no description of the desired estuarine conditions is included. More analysis and explanation is

needed on considerations such as the desired extent and location of sea grasses and the associated freshwater flow regime, the conditions needed to support a healthy reproducing oyster population, and flows needed for the maintenance of a healthy estuarine fish population.

It would seem most appropriate to address the water needs of the Loxahatchee Slough, River, and Estuary comprehensively or at least concurrently to ensure that all components of the natural system maintain necessary levels and flows so that they can begin to function properly together.

**Recommendation:** Set timeframe to establish MFL for Loxahatchee Slough.

**Recommendation:** Revise MFL document to more thoroughly address desired conditions for Loxahatchee Estuary and flow necessary to achieve those conditions.

## **TRIBUTARIES**

Tributary inflows to the northwest fork account for nearly 50% of the River's inflow, yet the proposed MFL only measures inflow from one point (Lainhart) -- no MFLs are proposed for any of the River's additional tributaries: Cypress Creek (26-32%), Kitching Creek (11-13%) or Hobe Grove Ditch (5%).

Due to a lack of data, the MFL model assumes tributary inflows to be a constant fraction of the discharge at Lainhart dam. This does not appear to be a safe assumption. Because the tributaries were excluded from MFL development, it may not be reasonable to assume that these flows will remain constant, particularly because the tributaries are virtually ignored in the proposed recovery strategy. The proposed MFL in no way ensures that these flows will not be reduced or diverted by development or otherwise.

Failure to properly address tributary inflows is particularly concerning for Kitching Creek, which still contains large areas of healthy cypress forest. An MFL which only protects areas upstream of River mile 9.2 and does not require any minimum tributary inflow from Kitching Creek will allow significant harm to occur to the healthy floodplain swamp community at Kitching Creek.

Additionally, with the District currently in the process of acquiring vast portions of Cypress Creek, it would appear feasible and prudent to include restoration of flows from Cypress Creek, and other tributaries, as part of the overall MFL Recovery Strategy.

**Recommendation:** Revise MFL to establish minimum flows for each of the river's tributaries.

**Recommendation:** Include restoration of tributary inflows as part of the MFL Recovery Strategy.

**Recommendation:** Revise MFL to ensure protection of healthy cypress floodplain swamp community at Kitching Creek.

## **VEGETATION SURVEY**

On P. 132, the document states that based on comparisons of vegetation community descriptions from 1985 and 2002, it can be inferred that there has been little change in the distribution of freshwater and salt tolerant vegetation since the mid- 1980's. Existing canopy vegetative communities have been analyzed from aerial photographs from 1940, 1985, and 1995. However, the aerial coverage comparison was not brought up to date, which should be done to support the inference that there have been no significant vegetation change between 1984 and 2002 .

**Recommendation:** Update vegetation survey from 2002 aerial photograph.

## **REVIEW OF MFL**

Due to a current lack of data, uncertainties in the model, and ongoing studies and efforts to identify a restoration target, the proposed MFL, once established should be reviewed sooner than 5 years.

**Recommendation:** Review MFL in 2 years or after completion of joint DEP / SFWMD restoration target studies, to ensure MFL is appropriate in light of revised restoration target.

## **SFWMD Responses to FDEP Comments on July 15, 2002 Draft of the Loxahatchee MFL Technical Criteria Document**

### **SFWMD Staff Responses to Technical Comments**

1. This issue is addressed in the revised document. The flow analysis used to develop the MFL criteria were based upon best available information. There is a good amount of data available from the 1980-81, 1985 and 1989-90 drought periods where we have concurrent flow data from all of the tributaries. Comparison of actual data collected from the river during these low flow periods with those values used in the hydrodynamic model show good agreement. For example, the percent of flow contributed by the Lainhart Dam to the NW Fork used in the model was 44%. This compares with field measurements that show the Lainhart Dam to provide 45% of the flow for the 1980-81 drought dry season, 46% from the 1980-81 drought wet season, 40% from the 1989-90 drought dry season, and 56% from the 1989-90 drought wet season. Based on these data, the flow ratio of 44% provided in the model appears as a reasonable ratio for estimating the flow contribution provided by the Lainhart Dam and other tributaries during dry periods, the period of time that would be of most interest in setting the MFL.

The District has recently completed a contract with the USGS to update and improve the current flow/salinity monitoring program within the watershed. Additional flow gages and salinity monitoring instruments are being installed in Cypress Creek and Hobe Grove Ditch. These additional gages will provide the data needed to more fully understanding the role that these tributary basins play in shaping the river's salinity profile.

2. There are a number of acceptable methods to conduct field surveys of floodplain vegetation. A floodplain cross-section transect is one approach if the intent is to document the range of communities that exist at a particular point. The belt quadrat approach used in this study was designed to allow comparison of areas within the floodplain that had approximately equal exposure to flooding and drying caused by river water level. A more random sampling approach to locating sites within the floodplain is appropriate from a population that can be assumed to have a normal distribution. In this case, sites were located selectively, rather than randomly, to represent areas that were not obviously influenced by structural features of the floodplain. This protocol is clearly explained in the Methods section of the report. Again, these data represent best available information. We are not aware of more recent data conducted along the river corridor other than the Ward & Roberts (unpublished) vegetation surveys conducted in 1993.
3. As explained in the report, this was a preliminary effort to obtain background information that could be used to develop a more comprehensive soil/salinity monitoring program. In response to FDEP's comment, in an ideal world, every vegetation survey point would have had associated detailed topographic survey data as well as soil salinity data, descriptive soil profiles, and soil chemistry analyses. Our ability to collect and analyze soil samples was limited by both staff time and budget. As a result, only a few samples could be collected and analyzed for the most basic indicators of saltwater influence. The soil salinity sites were selected to corresponded to plant survey sites at selected points in the river that we hoped would best represent the range of salt influence from frequent exposure to infrequent exposure. A much more comprehensive look at soil salinity is warranted, including intensive

sampling at a range of depths at frequent intervals, especially during dry periods, to account for the fact that salt may only be detectable in the soil when salinity is high in the river and may be rapidly removed from surface soils when freshwater flows in the river increase. In Chapter 6 we discuss future monitoring and research efforts designed to obtain better soil salinity information along the river corridor.

Questions 4, 5 & 6

Figure 19 has been modified illustrate average annual flows from Lainhart Dam rather than from G-92. This figure was placed in the report at the request of Tom Swihart. The purpose of Figure 19 is to represent decadal differences in freshwater flow patters, i.e. to compare flow conditions in the 1970's with the 1980' and 1990's. It seems reasonable therefore to compare data from the 70's and 1980's as "historical" and data from the 1990's as "current." Another approach that could have been used, of course, was to use 1987 as the divide point, as you suggest. Still another approach may have been to use 1983 or a 1985 as the divide point (before and after wild and scenic river designation), or 1979 (before and after the consent decree). As noted, there were significant differences in rainfall patterns between the 1970s, 1980s, and 1990s and the increases in rainfall during the latter decades may have been responsible for the observed overall increase in average flows to river during this period. This issue is discussed in Chapter 2, Figure 4 and in Chapter 5. The more critical issue from our perspective, as noted in FDEP's comment, is that the incidence of very low flow events has not improved substantially during this period. As shown in Table 24, the occurrences of flows less than 20 cfs and less than 10 cfs have remained approximately the same. Table 24 shows that during the 1990s flows less than 35 cfs occurred 25% of the time, as reflected in 73 events, with an average duration of 15 days and a return frequency of two months. Although we did not do the math to determine exactly how many violations of the proposed MFL criteria this represents, we felt it was safe to assume that, on average, we could expect that the proposed MFL criteria were probably exceeded 4-6 times per year. Under the proposed criteria, flow rates below 35 cfs for 20 days duration, would only be allowed to occur once ever six years.

The conclusions presented in the report was not that the resource had not been harmed by current flow conditions, but rather that recent flow conditions have not caused noticeable further degradation of the resource, relative to conditions that existed in 1985, the point in time when the river was designated as Florida's first Wild and Scenic river. A section of the river has been identified in the report that is presently experiencing significant harm, due to the effects of historical and current flow conditions. Again, these conclusions are based on best available data.

7. Table 25 is based on analysis of routine water quality sampling data that is collected periodically by LRED. As they mention in their report, the "Wild and Scenic" segment of the river contains one downstream station that is often estuarine in character and frequently has elevated salinities. Nevertheless, comparison of the 1998-2001 drought years, with historical average conditions, indicates significantly higher salinities. Unfortunately a comparison was not provided with historical drought periods, such as may have occurred in 1971, 1981 and 1989. The District's contention that impacts to the river have remained relatively stable since 1985 was based on assessment of floodplain the vegetation communities recorded in this study, vegetation maps provided in the FDNR 1985 Wild and Scenic River EIS, and a FDNR



1993 survey of the river. Comparison of these vegetation maps are provided in the revised final draft.

8. We agree with all of these points and have tried to insert the appropriate qualifying text in the document.
9. The estimates of consumptive use are based on several sources of information. This includes the amount of water allocated in consumptive use permits, the amount of water that is reported to be used by utilities, estimates of water use based on land use type and weather conditions, and estimates of water use provided by the USGS. If there are other more appropriate sources of information available that should be included within the document, we are not aware of this information. In response to a number of consumptive use questions posed by FDEP staff, the District agreed to conduct additional modeling to provide more definitive answers to these questions. The MODFLOW modeling effort was designed to provide a general indication of relationships between surface and ground water as a means to develop an integrated approach to assessing cumulative impacts of water withdrawals in the basin. At this point in time, this model represents the best tool we have to address this type of question. The information contained in Appendix I was revised after copies were provided to FDEP. The new revised version includes a discussion of the accuracy of the model and indicates a difference of up to approximately 10 cfs, of which about 50% is attributed to consumptive use withdrawals by major utilities.
10. We agree with FDEP comments that this reference provides only a generalized description of vegetation habitats. Appropriate qualifying information will be placed in the document.
11. We agree that a range of species and characteristics needs to be considered in terms of monitoring the overall health of the community and determining both long-term and short-term impacts and restoration needs of the system. A more comprehensive study and monitoring program is warranted within the watershed. A summary of proposed future research projects is provided in Chapter 6, in the section entitled *Research Needs*. This particular suite of vegetation monitoring parameters was chosen because it was felt that they were best suited to determination of significant harm that takes more than two years for recovery to occur.
12. Results from a number of different tools and types of analyses were combined to address these issues and develop management criteria. Figure 32 shows that, under current operating conditions, salinities of 2 ppt occur infrequently (for 20 days once every six years) at river mile 10.2 and often (several times a year) at river mile 9.2. Results of this model run were analyzed to determine how much flow was needed to prevent salinity at river mile 9.2 from exceeding 2 ppt. This flow was determined as 35 cfs. We proposed therefore, in order to protect the resources at river mile 9.2 from exposure to 2 ppt salinity, that river flows should not be allowed to drop below 35 cfs for more than 20 days, more often than once every six years.

Another analysis was made to determine the long-term average salinity that occurred at river mile 10.2. As shown in Table 34, that long-term average salinity was 0.15 ppt. Therefore we used the model to determine how much flow was needed to provide a similar salinity (0.14 ppt) at river mile 10.2. That flow value, as shown in Table 37 was about 100 cfs. Analysis of flow data from the river (see Figure 19 in the November 2002 report) indicates that during the past decade (1991-2001) the District has provided an average flow of 106 cfs to the river.



However, we did not choose to use the average annual flow as the MFL criterion because a) even though we are already providing 100 cfs annual flow on a continuing basis, the river is still experiencing long periods of low or no flow when salt water can penetrate far upstream into areas that have healthy floodplain swamp communities; and b) use of the annual average as a management criterion allows the potential for too much variability to occur (long periods of no flow can be “balanced” by short periods of high flow) to provide adequate protection for the resource. Therefore we chose to focus on the management of extreme events as the best means to prevent significant harm

13. Evidence presented in this report indicated that these six trees, although they are primarily freshwater species, can tolerate occasional exposure to salt concentrations of 1 ppt and even fewer exposures to salinities of 2 ppt as evidenced by the “exposure history” of the healthy floodplain swamp community that exists at river mile 10.2.
14. This is a significant misinterpretation of the intent of the analysis presented in this section. We attempted to analyze the conditions that exist at river mile 10.2 in terms of a number of different criteria related to salinity exposure, including the duration of exposure to various salinity levels and the elapsed time between exposure events, and the average salinity conditions
15. As also noted by the peer review panel, information in these tables was in error and has been modified in the revised document.
16. An analysis of this issue has been included in the revised document.
17. This concern has been raised by a number of reviewers. Review of past management practices indicates that this scenario is unlikely to occur except under extreme events. Adequate language to minimize occurrence of these kinds of events needs to be incorporated into the rule during the rule development process,
18. The recovery plan addresses this issue by providing adequate sustained flow through time (by 2006) to prevent increases above 2 ppt salinity, as required by state law.
19. Appendix E is being modified to address these types of concerns.
20. Appendix O has been rewritten to address apparent inconsistencies in the data.

### **SFWMD Staff Responses to Specific Editorial Comments**

1. The analysis of resources did not show significant resources that could potentially be impacted by reduction of flow from the North Fork River or from southwest Fork Tributaries. Additional analysis of these resources may be conducted in conjunction with the restoration effort.
2. This problem was fixed in the text.
3. Impacts of excessive flows are beyond the scope of the MFL effort but should be addressed in the development of a practical restoration plan for the river and estuary
4. This is a standard District graphic that serves a number of purposes. There is management consensus that the relationships shown here are appropriate.

5. Reference added to document. Please note that this restoration vision has not been endorsed by our Governing Board, nor has it been fully endorsed by the current restoration effort.
6. We would like to add the 2001 data. We have submitted a request for our modeling section to develop this information when the data set for the SFWMM is next updated.
7. We have included a copy of the state legislation designating this river in the appendices and cited the relevant state law in the document (Ch 83-358, Laws of Florida).
- 8-9. Details of flow events are provided in Appendix D and are discussed throughout the text. Text in this section was modified to address these comments.
10. Corrections were made in the text
11. We have no data to determine where oysters may have been present in the system historically. The fact that large amounts of material have been removed from the central embayment and the mouth of the river during the past century, suggesting that extensive oyster bars may historically have been present in this area.
12. This text was added to the document.
13. The text was modified in the document to address this issue.
14. The text was modified to address this issue.
15. Text was exchanged on the figure,
16. The text was modified in the report to address this comment.
17. We agree with the ideas expressed in this comment. The text in the document was modified to better explain these relationships. The purpose of the MFL is protect the resource. Water supply and flood control are functions of the resource that need to be considered when the MFL is developed. The effects of the proposed MFL on these functions needs to be assessed as part of the subsequent analysis.
- 18-19. This information was added to the document.
20. We agree with almost all of the statements in this comment. We are in the process of developing an interactive, groundwater and surface water, watershed modeling tool that can be used to assess the impacts of water withdrawals on river flows. This model will also provide a means to assess cumulative impacts of permits. Results of this work in progress are provided in Appendix I. An effort was made to use the model to predict interactions and then calibrate and verify the output against actual flow and water level data from the basin.
21. Text in the document was modified to address this comment and incorporate parts of the text provided.
22. Text in the document was modified to address this inconsistency. Our best estimates indicate that flows to the river are minimally impacted by groundwater withdrawals. Monitoring is one tool that is used to help estimate the magnitude of these impacts.
23. This section was modified in the document to clarify the intent including some of the text provided in your comment.
24. Comment noted.

25. We have recently obtained a copy of this report and are in the process of analyzing the data for application to the MFL.
26. Text in the document was modified to summarize the types of data available.
27. The total amount of water withdrawal in the basin, based on permit allocations, use data, and estimates derived from models is provided in Chapter 2 and also in Appendix O.
28. Change made to document.
29. An initial estimate of predrainage water conditions was provided in Appendix N. However, it was felt that this analysis was not detailed enough to provide useful information. An initial attempt was made to use the District's Natural Systems model to estimate historical flows from this basin, but the model grid (2 miles x 2 miles) was considered to be too coarse to provide useful information.
30. Comment noted. Our approach to MFLs is that they are in effect under all conditions, but the levels are maintained or exceeded under most conditions. MFLs become especially relevant during extremely dry periods when there is potential conflict between consumptive uses and the natural system for limited resources. The MFL recovery and prevention strategy is designed to ensure that adequate water is available to meet the MFL criteria and also meet regional water supply needs so that there is no need to compete for water for all rainfall conditions that are less severe than a 1-in-10 year drought.
31. The only data from Russell and McPherson that was used in this table was flow data for the North Fork.
32. We are not aware of any data prior to 1971. If data are available we would like to consider use of this information in the document.
33. Comment noted. The dots represent individual wells. Permits typically are issued to landowners or utilities that operate a number of wells on their property. Thus a single permit may be represented by a cluster of dots in close proximity on the map. Impacts are evaluated for each permit and thus consider the combined effects of withdrawals that occur from all of the wells covered by the permit.
34. The attempt to develop a cumulative analysis of the effects of consumptive uses in the basin is presented in Appendix I. Another analysis of cumulative impacts, using more conventional techniques is presented in Chapter 2. Both methods resulted in an estimate that consumptive water use by the major utilities results in about a 5 cfs reduction in river flow.
35. Information on the timing of withdrawals was provided in Appendix O, indicating that utilities have peak withdrawals during the dry season, that rarely reach or exceed the amount allocated.
36. Spellings of names in this table were corrected. Mangroves are not a typical component of the freshwater VEC community, but their presence in transects should have been noted.
37. Seedlings were described as shorter than breast height (approximately 4 feet) whereas saplings were taller than breast height.
38. The text was changed in response to this comment
39. The text was changed in response to this comment

40. FDEP comments on this issue were incorporated into the document.
41. Comment noted. This figure was removed from the main document but is still provided in Appendix B.
42. The table in Appendix H was changed in response to this comment
43. Comment noted
44. An additional bullet was added to address dry season flows
45. The relationship of the MFL criteria to the *Stipulation of Consent Decree* is mentioned in Chapter 6 in conjunction with the recovery and prevention strategy
46. Actions that will be taken by the SFWMD in response to MFL exceedances are discussed in Chapter 6 and include both operational and regulatory activities.
47. The text was changed to address this comment.
48. The text was changed to address this comment.
49. The text was changed in response to this comment.
50. The text was modified in response to this comment to clarify relationships among management goals.
51. Text from this comment was added to the document.
52. Text from this comment was added to the document
53. Document text was modified to clarify this apparent discrepancy.
54. Text about relationship with CERP was added to the document. Action steps that describe how restoration will occur are expected to be developed during the coming year for input to next year's budget cycle.
55. Text added to document to address this comment
56. Information from this comment was added to the document
57. Details of this effort will be developed during the next budget cycle after the MFL has been adopted
- 58-59. Hopefully we have caught all of the discrepancies in the Table of Contents and cross-references to the appendices.
60. These figures were added to Appendix A.
61. Appropriate disqualifiers have been added to this Appendix to explain the limitations of the modeling approach.
62. This appendix has been rewritten to address a number of discrepancies and inconsistencies
63. These are good suggestions for a completely revised approach to this document. Unfortunately, we do not have time or resources to make these changes now, but will certainly consider this approach in future documents.
64. These errors will be fixed in the document.

To: Loxahatchee River Coalition/Jupiter Farms Environmental Council  
*info@loxrivercoalition.org*

From: Planning and Development Division, Water Supply Department, South Florida Water Management District (SFWMD)

Date January 7, 2003

Subject: SFWMD Staff responses to the draft comments, dated September 12, 2002, that were received from the Loxahatchee River Coalition concerning public response to the recommended Minimum Flow & Levels for the Loxahatchee River & Estuary.

Thank you for your extensive and detailed comments on the SFWMD July 2002 publication entitled, *"DRAFT Technical Documentation to Support Development of Minimum Flows and Levels for the Loxahatchee River and Estuary"*. We appreciate the time and effort taken by the Loxahatchee River Coalition to carefully review this document and provide thoughtful and constructive comments.

We were especially pleased to see that many of the issues you mention were similar to concerns raised by other agencies, concerned citizens and the peer review panel. In many cases, the changes that you have suggested in your comments have been addressed in the revised and updated November 2002 version of the document and appendices. We have included new or additional information, analyzed additional data, and provided new or updated interpretation and discussion, based on your suggestions. The final product has been greatly improved by the valuable insights, suggestions and information provided by the Loxahatchee River Coalition.

We have identified a few of the questions or concerns raised by The Loxahatchee River Coalition that we feel warrant further discussion and clarification, as noted on the attached pages. Please also take the time to examine the updated documentation we have placed on the SFWMD website at [www.sfwmd.gov/org/wsd/mf/loxmfl/docs.html](http://www.sfwmd.gov/org/wsd/mf/loxmfl/docs.html) or contact Cathy McCarthy at 561-682-6325 if you would like to receive hard copies of these reports. If you have additional technical comments or concerns, please contact the project manager, John Zahina at 561-682-6824.

**LOX RIVER COALITION COMMENT:*****I. Current data is incomplete (part A)***

*The District's Staff has indicated that the current data sets they are using are incomplete and therefore they should take into consideration a seasonally fluctuating minimum flow based on prior comprehensive research.*

*In a meeting with the Loxahatchee River Environmental Control District [LRED] on August 7<sup>th</sup>, SFWMD staff indicated that District data on salinity and flows for the Loxahatchee River is incomplete. LRED offered to share the bi-monthly data that they have collected for over ten years. SFWMD staff asserted that they need to install salinity, flow and temperature probes at various points in the river and that after one year they will have enough data to extrapolate a more complete model. Based on District staff comment we conclude that the SFWMD's current dataset is insufficient to construct an MFL regime that will adequately protect the River.*

**DISTRICT STAFF'S RESPONSE:**

The Minimum Flow and Level Statute (Ch 373.042(1)(b) F.S.) instructs water management districts “. . . using the best information available.” All available salinity data from the Loxahatchee River were compiled and considered in developing the proposed MFL. This included the list of studies presented in Appendix A, the technical analyses presented in Appendices D, E, F and P of this report, as well as water quality data available from various agencies. Salinity data from the Loxahatchee River Environmental Control District (LRECD) were used to calibrate and verify the hydrodynamic salinity model for the Loxahatchee River (Appendix E).

Salinity data from the LRECD for upstream areas of the NW Fork can be divided into two types. The bi-monthly data (1991 to present) was collected for two water depths. Unfortunately this salinity data does not capture the daily changes that can occur over short time intervals (minutes to hours) due to tidal influences. In reality, salinity concentrations vary considerably from hour to hour at different sites each day as the tidal surge moves upstream and recedes from the river channel. A single sampling event is only able to determine salinity at a specific location at that moment, but cannot tell us what the minimum, maximum, and daily average salinity is for that site. Only a continuous sampling event, such as one where water samples are collected at multiple depths at regular intervals (such as once an hour) can provide that kind of information. Because of the expense and manpower requirements of this type of sampling, it is typically only conducted sporadically during low flow conditions. The second type of data collected by LRECD is this kind of continuous sampling event. Since the hydrodynamic salinity model calculates salinity along the Loxahatchee River for each half-hour time step, it was the continuous salinity data that were used to compare how well the model predicts measured salinity. The results from that analysis are in presented in Appendix E. Based upon a comparison of what the model predicts and what was actually measured at various sites along the NW Fork, we concluded that the model is the best available tool that can provide reasonable predictions of salinity conditions on the river.

When we indicated that current salinity data sets are incomplete, we mean that there was no continuously-sampled salinity data set for the NW Fork that covered the desired long period of time (e.g. 30 years) at specific locations where plant communities have been studied along the

river. This information is necessary in order to associate a salinity exposure with damage to freshwater plant communities. However, shorter-term, continuously-sampled data were available from LRECD for the period from 1995 to 2001 and were used to calibrate the hydrodynamic salinity model. Comparison of these data with results of model simulations, indicated that the model produces a reasonable estimate of long-term salinity conditions on the river. The model was then used to estimate a long-term (30 year) salinity time series at each of the eight vegetation sampling sites.

This method of using a model to estimate past conditions has been used elsewhere. For example, the St. Johns River Water Management District used a model to estimate a historical lake level time series using long-term rainfall and aquifer level data. Using the output from this model, “historical” levels in Lake Washington were estimated and used as a basis for developing an MFL. Models have also been used to estimate past or future conditions in the development of all regional water supply plans completed by the SFWMD and to develop simulations for the Comprehensive Everglades Restoration Plan (CERP) and are widely accepted as valuable tools in investigating water resource needs. This approach is also discussed in the USGS report entitled, “Instream Flow Incremental Methodology,” which relies heavily on the use of models to “backcast” historical hydrologic conditions when no data are available. More information can be obtained from the USGS web site ([www.mesc.usgs.gov/products/software/ifim/](http://www.mesc.usgs.gov/products/software/ifim/))

Additionally, as part of the MFL recovery plan, flow, salinity, and temperature sampling is planned for the Northwest Fork and its three major tributary streams. This information is needed to develop and verify a 3-dimensional hydrodynamic model for the Loxahatchee River now in development. That study will be able to directly relate different flows from tributary sources with varying salinity concentrations both vertically in the water column and spatially along the river. This “next generation” of salinity model for the river will greatly improve our ability to simulate different management scenarios and will be the basis for future revisions to the MFL.

#### **LOX RIVER COALITION COMMENT:**

##### ***I. Current data is incomplete (part B)***

*While the District develops a more complete model, we suggest the District investigate use of the LRED’s research, especially as interpreted in “Freshwater Flow Requirements and Management Goals for the Northwest Fork of the Loxahatchee River” (Dent & Ridler, 1997). This study recommends a minimum flow of 75 cfs for the height of the dry season (April-May) and suggests a seasonally fluctuating minimum flow up to 130 cfs throughout the wet season (July-November).*

#### **DISTRICT STAFF’S RESPONSE:**

A review of all flow-salinity studies that have been conducted on the NW Fork of the Loxahatchee River (see Appendix A) reveals that the numerous authors have taken the position of determining a Lainhart (or Lainhart plus other tributaries) flow in order to manage the river for control of salinity concentrations. It is important to note that these studies (1) consider only salinity management in protection of the freshwater floodplain swamp; (2) vary widely in their recommendations for a minimum flow; and (3) vary widely in their opinions of where the



transition between saltwater and freshwater conditions should occur. Although these studies have produced valuable information concerning the relationship between river flow and salinity, and presumably recommended a minimum flow to prevent *harm*, none were developed based on the specific statutory MFL requirements of Chapter 373.042 (1) F.S. that require assessment of the effects of withdrawals and protection from *significant harm*.

#### **LOX RIVER COALITION COMMENT:**

##### ***II. Florida law requires the establishment not just of minimum flows, but also minimum levels.***

*Specifically, Florida Statutes §373.042 requires that water management districts develop minimum flows and levels for surface waters and aquifers. The District's documentation and recommendations would only address part 1a of this statute by recommending a minimum flow of 35cfs over Lainhart Dam. It does not, however, recommend an explicit minimum level as required by part 1b.*

#### **DISTRICT STAFF'S RESPONSE:**

You are partly correct. Florida law (Chapter 373.042(1) F.S. requires each water management district to establish minimum flows and levels (MFLs) for surface waters and aquifers within their jurisdiction. The statute however goes on to state that “minimum flows” will be established for all surface watercourses in the area, and that a minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area. The statute also defines the term “minimum water level” as the level of groundwater in an aquifer and the level of surface water at which withdrawals would be significantly harmful to the water resources of the area.

Nowhere in the statute does it specifically state that both definitions (minimum flow and minimum level) must be determined concurrently for each water body. The SFWMD has determined that the Northwest Fork of the Loxahatchee River is a natural surface watercourse, that the primary problem affecting the watercourse is the migration of saltwater upstream that has impacted the resource during dry periods, and that the most appropriate way to protect this resource is to provide a *minimum flow* that will reduce further upstream migration of salt water.

This is consistent with the approach used by the District to established minimum flow criteria for the Caloosahatchee and St. Lucie estuaries. In contrast, the District has established *minimum levels* for the Biscayne aquifer, Lower West Coast aquifers, Lake Okeechobee, and Everglades surface waters.

#### **LOX RIVER COALITION COMMENT:**

##### ***III Minimum levels are required to prevent further harm and degradation to the River***

*Although the Lainhart and Masten dams could arguably enforce their own specific minimum levels upstream (the height of the dams), a minimum level needs to be set for that segment of the River that lies downstream of the Masten dam. If the District is determined to prevent further saltwater incursion, it cannot do so without setting a minimum level or otherwise ensuring that*

*minimum flows over Lainhart are increased in proportion to unexpected changes in flows from groundwater and tributaries.*

*Since District staff has conceded that knowledge of the hydrodynamics and ecology of the Loxahatchee River and Estuary is incomplete, it is therefore conceivable that supplying a minimum flow of 35cfs over Lainhart Dam may not be sufficient to keep the salinity at river mile 9.2 from exceeding 2 ppt. To safeguard against potential flaws in the District's minimum flow modeling, an explicit minimum level needs to be set for river mile 9.2 in conjunction with the 35cfs minimum flow over Lainhart Dam.*

#### **DISTRICT STAFF'S RESPONSE:**

At the request of reviewers, a study of the water levels in the floodplain swamp along the NW Fork was conducted. Surveyed transects across the floodplain of the NW Fork were used to determine the elevation (NGVD) of the floodplain between the opposing upland embankments at 10 ft increments. These surveys were conducted in December 1983, before the designation of the NW Fork as "Wild & Scenic" and before the surrounding lands were purchased by the District for preservation. Stage recorders were installed at four transect locations to measure water levels from September 1984 through June 1990. Continuous stage data are available at Lainhart Dam from April 1971 to present. The locations of these transects, which lie between Lainhart Dam and Trapper Nelson's site, represent the most pristine river floodplain swamp.

The results of this floodplain water level study provided more insight into the hydrological needs of the remaining floodplain swamp. Correlations were established between flow over Lainhart Dam and water levels at these transects. These estimates of water levels at each transect were then used to calculate the percentage of flooding in the floodplain. These results indicate that more than 50% of the floodplain swamp is inundated at a flow of 35 cfs. At flows of 65 cfs, 65% to 75% of the floodplain is inundated. These results are compiled in Appendix N of the November 2002 version of the Final Draft Technical Document. Studies that have been conducted in floodplain forests throughout the world have shown that the soils in such forests must be allowed to dry out occasionally, for sufficiently long periods to allow seed germination and growth. Failure to provide such conditions will eventually lead to damage and loss of the floodplain swamp. Clearly, setting a minimum flow or level where the floodplain is rarely allowed to dry out will destroy the floodplain forest. The current Consent Agreement, which requires the District to provide 50 cfs when upstream water is available, and the proposed minimum flow criteria, which allow a very short (20 day duration) period below 35 cfs every six years, represent a balance among competing management objectives. These flow regimes are designed to limit saltwater intrusion, provide sufficient inundation for the floodplain swamp to protect aquatic organisms and still permit occasional drying of floodplain soils.

#### **LOX RIVER COALITION COMMENT:**

##### ***IV. Recommended minimum flow requires more controls***

*For the current recommendation of 35cfs over the Lainhart Dam to work effectively, more controls are needed.*

*Due to the lack of data for groundwater and stream flow from tributaries, the model calibration was based on the historic flow recorded at Lainhart Dam to estimate the total freshwater input to the river system. In the model, discharges from tributaries were calculated as a constant fraction of the discharge at Lainhart Dam (i.e. total surface freshwater input in the model was linked to Lainhart Dam flow via flow ratios. Flow factors of 0.65 for Cypress Creek, 0.14 for Hobe Grove, 0.08 for Kitching Creek, 1.4 for Trappers and 1.16 for LOXTnpk were established. For example, if the flow at Lainhart Dam was in fact 100 cfs, the model would recognize the flow for Cypress Creek at 65 cfs, 14 cfs for Hobe Grove, 8 cfs for Kitching Creek, 140 cfs for Trappers, and 116 cfs for LOXTnpk.*

*Another assumption used in the model was a constant input from ground water of 40 cfs. Cypress Creek, Hobe Grove, Kitching Creek and the NW fork at Trappers each received 10 cfs of groundwater input for a total ground water input of 40 cfs.*

*These model assumptions have important ramifications:*

- 1. The total inflow to the NW fork associated with a flow of 35 cfs at Lainhart Dam is considerably larger and includes discharges from groundwater and tributaries. Under the 35 cfs at Lainhart Dam Scenario, tributary flows would be modeled as follows: Cypress Creek 33 cfs, Hobe Grove 15 cfs, Kitching Creek 13 cfs, Trappers 59 cfs, & LOXTnpk 40 cfs (flows include groundwater contributions of 10 cfs).*
- 2. The flows for the tributaries were assumed to be proportional to the flows from Lainhart Dam and hence may not accurately represent actual flows, especially with depressed water tables.*
- 3. Groundwater levels that produce the assumed groundwater input may not be present when needed most.*

*The following controls would mitigate potential problems under the current proposal:*

- 1. The establishment of a minimum level for groundwater so that the groundwater level that produces 40cfs in the model is adequately protected.*
- 2. The establishment of minimum flows for the tributaries in order that their modeled flows corresponding to the Lainhart Dam minimum flow of 35 cfs are protected.*
- 3. When tributary surface water flows fall below their corresponding modeled flows for 35cfs at the Lainhart Dam, then the Lainhart Dam flows are to be increased by the difference.*
- 4. When groundwater levels fall below the level needed to produce the modeled 40cfs contribution, then Lainhart Dam flows are to be increased to be commensurate with the groundwater loss.*

**DISTRICT STAFF'S RESPONSE:**

Your observations about the assumptions used in the modeling and their operational and management implications are valid concerns that will ultimately determine how effectively this system can be managed and protected. Your suggestions for how to manage this system generally reflect the kind of approach and operational protocols that may be used once facilities are in place to deliver supplemental water to the basin. Under current conditions, however, the SFWMD has very limited capability to effectively manage flows to the river during dry periods.

There is evidence to substantiate the assumptions that the flow ratios used in this report are representative of tributary flows during dry periods. Actual tributary flow data collected during drought periods were analyzed and the ratios were very close to those used in the model. A further discussion of this issue is provided in the revised report and all of the data used for this analysis are provided in Appendix D of the November 2002 version of the Final Draft Technical Document.

Nevertheless, even though the numbers seem to reflect long-term or average relationships among the various sources of freshwater inflow, the various figures provided in Appendix D indicate that a great deal of variation occurred among salinities predicted by the model based on Lainhart Dam flows alone. This suggests that variability in other tributary flows, groundwater and perhaps effects of wind, storm surges or other factors also influence salinity along the river.

The District is presently installing additional tributary flow and monitoring facilities within the river and watershed. Continuous salinity monitoring will also occur at the points where the major tributaries join the Northwest Fork. A complementary groundwater monitoring network should also be considered, perhaps as part of the restoration effort. Data from these sources could be used to verify and refine our assumptions concerning how much freshwater is actually entering the system.

A more direct means to determine the success of the proposed MFL criteria would be to monitor salinity conditions at or near river mile 9.2 and determine the ability of the freshwater flow regime to actually prevent saltwater intrusion. This approach has now been added to the MFL Rule and will provide a means to integrate flow from all sources and, most importantly, indicate whether the amount of flow provided was actually protecting the resource. An approach of this type was used in the Caloosahatchee River and Estuary MFL, which provides criteria for river flow at the Franklin Lock and Dam and criteria for salinity exceedance at the point in the river where the resource (a bed of submerged freshwater plants) needs to be protected.

Most importantly, a comprehensive ecosystem monitoring effort is needed that examines not only the six key VEC species, which show long-term trends in the forest community, but also the 35-40 other herbaceous species and other appropriate features that can indicate stress or damage on shorter time scales.

The other critical component is to determine what actions can be taken if (when) a MFL exceedance occurs or is likely to occur. Until facilities are in place to provide more water to the river, such exceedances are likely to happen and the District is very limited in the actions that can be taken in response to such exceedances. Once new facilities have been constructed and additional water is available, the operational protocols associated with these facilities must be developed that will describe what actions taken to address MFL exceedances.

The South Florida Water Management District submitted a letter to the Florida Department of Environmental Protection on October 31, 2002, adding Cypress Creek, Hobe Grove Ditch, and Kitching Creek, the primary tributaries to the Northwest Fork, to the Minimum Flows and Levels 2003 Priority List and Schedule. The recent efforts to develop MFLs for the NW Fork of the Loxahatchee River indicated the need to better define, and establish MFL criteria for other tributary inflows to this river that had very little available flow data. The District has committed to developing MFLs for these water bodies by 2007, which will allow the staff sufficient time to collect and analyze flow data from the gauges that will be installed within the tributaries this year. The proposed MFL rule reiterates the intent to develop MFLs for these tributaries and also for the Loxahatchee Slough.

In addition, portions of Cypress Creek, Kitching Creek and Hobe Grove Ditch, which extend westward from river mile 10.6 to the intersection of Gulf Stream Citrus Road (latitude 26.96484, longitude 80.1855), from river mile 8.1 northward through JDSP to the north of Bridge Road (latitude 27.05513, longitude 80.17580) and from river mile 9.1 westward to the Hobe-St. Lucie Conservancy District pump station outfall (latitude 26.5908, longitude 80.1031) respectively, were included in the description of the Northwest Fork MFL water body.

Under our current management practices, flows to the river are largely driven by local rainfall events. When rain falls in the watershed, the excess runoff flows to the canals and rivers and is discharged to tide. This results in flow rates that vary widely from as little as 50 cfs up to 1,200 cfs or more during extreme storm events. When there is no local rainfall, seepage of groundwater out of the sloughs and into the canals and tributaries, provides a base flow of surface water that feeds into the river. As the dry season progresses and groundwater levels decline further, water levels in the rivers and canals also decline until they may reach a point that water no longer flows across the structures. During such periods, river flow is probably controlled by groundwater seepage -- around the control structures and into the river channel.

The SFWMD controls discharge into the Northwest Fork of the River through the G-92 structure. Operational guidelines for these facilities are described in Appendix L of the November 2002 version of the Final Draft Technical Document. When there is little or no rainfall occurring in the Loxahatchee River basin, but water levels upstream of the structure are high enough (12.5 feet or above) to allow water to pass, a flow of 50 cfs is provided through this structure to the river. As water levels approach 12.5 feet, discharge rates are reduced so as to be able to prolong the period of discharge. If water levels are not high enough upstream to provide a flow of 50 cfs, then whatever amount of water is available, is allowed to pass through the structure. Once upstream water levels are below 12.0 feet, the G-92 structure is closed no water can pass. All flow in the Northwest Fork is then provided by local rainfall, runoff and seepage occurring further downstream.

Water flows from G-92 downstream through the C-14 Canal, past the drainage outlet from Jupiter Farms to the Lainhart Dam. This means that flow across Lainhart Dam is the total amount of flow from G-92 plus the amount of water discharged from Jupiter Farms plus a small amount of groundwater seepage that occurs in that portion of the canal.

By the time that flow at Lainhart Dam drops below 35 cfs, there is only a very small amount of water available in Loxahatchee Slough. Even if it were possible to force more water through the G-92 structure (for example with a pump), the result would be that the slough would empty

faster. A short-term gain in flow rate would thus result in a longer period with reduced or no flow occurring to the river. The only way to correct this deficiency is to provide more storage.

#### **LOX RIVER COALITION COMMENT:**

##### **V. Florida law requires MFLs for the entire River.**

*Florida Statutes §373.042 provides explicitly that the water management districts shall establish minimum flows “for all surface watercourses.” It was not the intent of the statute to require that the districts establish minimum flows only for federally recognized wilderness preserves. In fact, the law states that the districts shall establish minimum levels for groundwater, as well as, surface waters. Given the rate of development in the adjacent areas, we are concerned about the impact of further groundwater withdrawals not only on the river, but also on the surrounding protected areas (Jonathan Dickinson State Park, Riverbend Park, Cypress Creek Tract, and Pal Mar, etc.).*

*Although the Wild and Scenic portion of the NW Fork is an exceptional natural resource, the entire river is of significant ecologic, economic and aesthetic value to Palm Beach County and the State. The estuary is home to a thriving fishing and boating economy that contributes important revenue to the local economy. Riverfront property is among the most valuable in the area and homeowners have a vested interest in the health of the entire River. We do not agree with the District’s reasons for setting only a minimum flow for a small segment of the NW Fork based on the lack of “infrastructure and facilities.” The statute in question does not ask the District to “provide and manage” flows. It requires the District to determine minimum flows and levels beyond which further withdrawals would be “significantly harmful to the water resources or ecology” thus providing the districts with a limit at which to prevent further withdrawals.*

#### **DISTRICT STAFF RESPONSE:**

The SFWMD has limited resources and staff to use for development of MFLs and there are many areas within the District that are severely threatened. That is the reason for the MFL Priority Waterbody List. The District has chosen to divide up areas in order to establish MFLs, based on available information, coordination with other activities, and the principle that protection of the most sensitive indicator of resource impacts will also provide protection for less-sensitive resources. Also, as identified in the MFL legislation Section 373.042(2) F.S., priorities are established based on “. . . existence of potential for significant harm . . .” and “. . . those waters that are experiencing or may be reasonably expected to experience adverse impacts.”

Examples of this approach are seen in the MFL criteria that have been developed for other areas within the District as follows:

- For the Biscayne Aquifer, MFL water levels were established for the northern part of the aquifer in 2001 and water levels for the southern part will be identified in 2004 in conjunction the Biscayne Bay MFL.
- In the St. Lucie Estuary, MFL criteria were based on protection of the oligohaline zone in the estuary. There were no perceived threats to freshwater systems in the rivers themselves



that would not be adequately protected by providing the amount of water needed to protect the estuary.

- In the Caloosahatchee River and Estuary, providing the flow needed to protect the freshwater plant community located downstream of the locks and dam would also protect resources in the river itself and downstream estuarine communities.

District staff recognize that the proposed criteria for the Northwest Fork of the Loxahatchee River do not provide adequate protection for the tributary basins and therefore have added these tributaries to the 2003 MFL priority list.

Ultimate resource protection of the Loxahatchee River and estuary lies not just with establishment of the MFL and recovery plan, but also with the establishment of a water reservation in conjunction with the definition of practical restoration goals and an associated restoration plan. The MFL criteria will then need to be revised to be consistent with the restoration plan and reservation.

#### **LOX RIVER COALITION COMMENT:**

##### **VI. Sampling conducted to date is insufficient**

*In the June 10<sup>th</sup> draft of their FAQ about MFLs for the Loxahatchee River, the District staff cites that peer review observed that cypress trees were “not particularly good indicators of salinity stress.” In response staff selected a number of Valued Ecosystem Component [VEC] species. Although the District staff appears to have done a good job at assessing the health of the selected species, the selection of only large, woody plants provides only a very narrow cross-section of the River’s diverse population and is not a true indicator of overall river vegetation.*

*In our opinion the VECs of the river must necessarily include aquatic life such as herbaceous aquatic plants, fish, amphibians, and other species that are more sensitive to saltwater intrusion than just the few selected species.*

#### **DISTRICT STAFF’S RESPONSE:**

District staff recognizes that the selected VEC “key” species represents the selection of only large, woody plants and that these are only a very narrow cross-section of the River’s diverse population. District staff feels that the VEC “key” species considered (9 in all, see Table C-2), as well as other aspects of the community (e.g. total number of species, measurement of growth parameters, and canopy structure) are true and reliable indicators of overall freshwater floodplain vegetation health.

An important consideration of this analysis is that the primary VEC in the Loxahatchee River MFL is not a **species**, but the entire **vegetation community structure**. A discussion of the ecological importance of maintaining the freshwater floodplain swamp can be found on pages C-19 to C-20 (also see pages 107-110). This VEC is holistic in scope, as outlined in the definitions of “No Harm,” “Stressed,” and “Significant Harm” provided on pp. 146-147. This VEC was developed based on consideration of the following:

- (1) Identification of the dominant species in the freshwater floodplain swamp (both in terms of physical size and biomass), which are listed in Table C-2 on page C-9. Five of these species are strictly freshwater in distribution;
- (2) The total number of other plant species present (see Figures C-3a and C-3b, page C-11);
- (3) Growth measurements of the dominant species (see Table 31, page 116);
- (4) A decline in floodplain forest canopy structure (see Figures C-4a, C-4b and C-4c, page C-14); and
- (5) The presence of seedlings/saplings (Table 32, page 116), which indicate the ability of the community to reproduce itself.

District staff considered other potential VECs, including herbaceous aquatic plants, fish, amphibians and other species that are potentially more sensitive to saltwater intrusion. Many of these species, although they may be rapidly affected by saltwater intrusion, will also recover very rapidly once salt water is removed, and hence cannot be used effectively as a basis to define significant harm that takes two or more years for recovery to occur.

Also, herbaceous plants tend to have shallower root systems and hence may not respond to the effects of saltwater intrusion to the same extent as the larger trees. Because seawater is denser than fresh water, saltwater intrusion generally occurs first at the base of the aquifer, resulting in contamination of deeper waters before the shallow zones of the aquifer and surface waters are affected. In addition, herbaceous species may also respond rapidly to a number of other environmental variables such as the effects of drought, fire, frost or disease and therefore may not be the indicator of long-term salinity effects.

Because of the lack of scientific data that documents salinity tolerance in many plant species found along the Loxahatchee River, the semi-quantitative vegetation study was conducted in 2000-2001 to indicate the best potential indicator species. The result of this study was the selection of those species that were included in the VEC. Unfortunately there were no native and widespread herbaceous aquatic plants that occurred in the freshwater floodplain of the Northwest Fork, hence no particular species were proposed as indicators of salinity intrusion to that area. Fish, amphibians and birds are mobile and can move in response to changes in salinity conditions. Hence the location of these species today may not reflect what has occurred at the site during the last dry season (which may have damaged the plant community). To compound this problem further, standing freshwater may be found in backwater areas during periods when the river channel may have elevated salinity. Measurement of such mobile organisms (fish, amphibians, and birds) at particular river segments may thus confound direct correlation of community change to salinity. In addition, there were no long-term or comprehensive monitoring data for the distribution of these organisms within the Loxahatchee River system that that could be used a basis to determine the extent to which these organisms have been impacted by flow rates, water levels or salinity.

To address these issues, District staff will continue to investigate potential VECs that will be used to monitor brackish and saltwater portions of the Loxahatchee River system, including species suggested above and others (including algae and invertebrates). The MFL proposed in

this document focuses on protection of the remaining freshwater floodplain swamp community, which is the resource that the “Wild & Scenic River” was designated to protect. In order to continue to protect the “health” of the freshwater floodplain swamp, District staff feel that studies conducted to date confirm that the current VEC is appropriate to the resource, was developed based on the best information available.

#### **LOX RIVER COALITION COMMENT:**

##### **VII. The report is overly reliant on aerial photography and contemporary data regarding the health of the River**

*In our opinion the District has relied too heavily on aerial photography in the assessment of the River’s health and failed to obtain enough detailed hydrological & biological information (or “ground truth”) necessary to properly support the broad assumptions based on the extant photographic record. Furthermore, the District has not satisfactorily addressed the possibility of harm that might have occurred between 1995 and 2002.*

*On page 123, the Draft states, “...19 additional acres [of freshwater vegetation] were lost from this community between 1985 and 1995.” It does not indicate how many acres have been lost between 1995 and 2002. Throughout the Draft, the District presents 1995 (mainly photography) data as if it is up-to-date. If no aerial photography is available for 2000 or later then a thorough ground survey may be required in order to accurately determine the state of the River and watershed today.*

*In our opinion the District staff have not been provided with the resources required to accurately measure the River’s current condition and how that condition has changed over time. While staff has surveyed the encroachment of mangroves into the cypress forest up until 1995 but we remain unconvinced that substantial damage has not occurred to the River since 1985. Furthermore, the justification for using the date of the River’s Federal Wild and Scenic River (1985) as a benchmark (or base) for setting the MFLs, has not been substantiated. The state requirement for MFLs was created through the enactment of §373.042, Florida Statutes in 1972 and the designation of Jonathan Dickinson State Park occurred in late 1940’s. If a date is needed for determining what stage of freshwater flow the MFLs should aspire to, then the District should use the designation of the State Park.*

#### **DISTRICT STAFF’S RESPONSE:**

Aerial photographic surveys from 2000 are only now becoming available and, as such, were not used in the July 15<sup>th</sup>, 2002 draft document. Analysis is ongoing. However, extensive field surveys of the vegetation community along the NW Fork were conducted between 2000 and 2002. This information is the most current and detailed vegetation information available for the River. This included the recording of all species and their abundance found at each of 33 sites (23 on the NW Fork, 10 on Kitching Creek), measurement of the height, canopy diameter, trunk diameter, and seedling/saplings of dominant tree species. The results of these studies are found in Appendix C and summarized in Chapter 4 (pages 84-86) and Chapter 5 (pages 111-118). The data from these surveys were used to develop the vegetation map presented in Figure 31-C, page 131. This map shows the present location of “healthy,” “damaged,” and “mangrove-dominated”

segments of the NW Fork, and was based solely on the results of the in-depth vegetation surveys conducted from 2000-2002 (not from aerial photography). When comparing this map (2002 conditions) with that developed by the Florida Department of Natural Resources (now FDEP) for the Environmental Impact Statement for the Wild & Scenic River in 1984 (Figure 31-A, page 131) the extent of freshwater and mangrove communities seems to have changed little, if any. In fact, the transition zone between mangrove and freshwater communities may be further downstream today than is shown on the FDEP's 1984 map. Additionally, the aerial photo study presented in Appendix B, which compared photography from 1985 and 1995, was unable to document any significant change between the mangrove-freshwater swamp boundary between these years. Since these two independent studies (field study map from 2000-2002 compared with 1984 FDEP vegetation map, and 1985 aerial photography compared with 1995 aerial photography) give similar results, the conclusion was reached that no significant change in extent of mangrove-freshwater communities has occurred in the NW Fork since the mid 1980's.

#### **LOX RIVER COALITION COMMENT:**

##### **VIII. Seasonal variability is an important consideration.**

*A static minimum flow does not take into account seasonal variability, which is essential for the preservation of the River's natural systems.*

*The District touches on seasonal variability in pp. 11,12 and 97, and on the erratic nature of that variability from year to year (often as the result of hurricanes, storms, El Niño, etc.) in Figure 4 on p. 12. It does not, however, significantly address how native biota are dependent on such variability as did the SJRWMD in setting MFLs for the Wekiva River System.*

*The SJRWMD, under the direction of Henry Dean in 1994, felt very strongly that setting one static minimum flow or level cannot sufficiently preserve either a lotic or lentic system as, over time, such a minimum often becomes the de facto average. The SJRWMD felt that lotic systems were best protected by a regime of multiple MFLs. It is for this reason that the MFL regime worked out for the Wekiva River, by SJRWMD is so exemplary. We can find no justification for setting an MFL that affords less protection to the Loxahatchee River.*

#### **DISTRICT STAFF'S RESPONSE:**

The intent of the MFL is to define the "limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042(1)(a), F.S.). Section 373.042(1)(b) indicates that "When appropriate, minimum flows and levels may be calculated to reflect seasonal variations." It does not direct the water management districts to define seasonal variability criteria or restoration targets. Seasonal variation in flow patterns and the amount of water needed for restoration are important components for overall river management. However, there are better tools available to accomplish these tasks.

A review of the MFL methods used by other water management districts, as well as the method that was applied to the Wekiva River, clearly shows that these approaches would not be appropriately applied to the Loxahatchee River. The Wekiva River is not connected to the ocean (is not threatened by salt water intrusion or sea level rise), is a highly altered system, and has floodplain communities that differ significantly from communities in the Loxahatchee River.

The Wekiva River system also has the advantage that 50 years of flow records were available for the spring. The primary issue addressed in the Loxahatchee River is the significant harm caused by intrusion of salt water within the upper reaches of the river during the dry season. No basis for significant harm due to withdrawals was determined to exist due to seasonal hydropattern conditions within the floodplain swamp. Analyses based floodplain transects indicate that these different management goals can be in conflict at higher flows, but at the proposed MFL flow of 35 cfs, both floodplain management and saltwater intrusion goals can be reasonably balanced. Furthermore, peer reviewers of the Wekiva River document indicated concern that the multiple MFL regime was not based on biological (resource) criteria, but rather upon historical water level (hydrologic) data. Development of comprehensive restoration and management targets for the Loxahatchee, which encompass low, average, and high flow conditions, are currently being carried out by a multi-agency team that includes the FDEP and SFWMD. These rainfall-based, seasonally varying delivery patterns, which reflect natural flow conditions in the system, will be the basis for water reservations -- the primary tool of the SFWMD associated with restoration.

#### **LOX RIVER COALITION COMMENT:**

##### **IX. As currently written the MFL Criteria would harm the Loxahatchee River**

*As currently written, the MFL Criteria would allow the minimum flow to be evaded substantially over-time and throughout the year, which would harm the River.*

*The wording of the minimum flow criteria needs to be corrected. As it could be misinterpreted to suggest that, during dry periods, the minimum flow over Lainhart Dam could be allowed to fall below the minimum for 20 days at a time, repeatedly, so long that it is brought back up to 35cfs every 21<sup>st</sup> day. Under such an interpretation, the policy would allow the minimum to be met as few as 17 isolated days throughout a year (4.72% of the time). We doubt that, under the current modeling, this would be sufficient to prevent further harm.*

*We suggest that the criteria include a policy wherein low flows trigger water restrictions, as per Henry Dean's outstanding work on the Wekiva River MFL regime, or a limit on how many days the flow may fall below the minimum throughout a single year.*

#### **DISTRICT STAFF'S RESPONSE:**

District staff have revised the proposed MFL rule language to address this concern. A MFL exceedance occurs within the Northwest Fork of the Loxahatchee River when flows over Lainhart Dam decline below 35 cfs for more than 20 consecutive days more than once in a six year period, or when the average daily salinity concentration expressed as a 20-day rolling average exceeds two parts per thousand more than once in a six year period. The average daily salinity will be representative of mid-depth in the water column (average of salinities measured at 0.5 meters below the surface and 0.5 meters above the bottom) at river mile 9.2 (latitude 26.9839, longitude 80.1609). If the drought event is greater than 1-in-10, Phase 3 restrictions will be imposed.

**LOX RIVER COALITION COMMENT:****X. There is no evidence to support the 50% reduction of the Minimum Flow from 70 cfs to 35 cfs.**

*There has not been shown significant credible scientific evidence in the July 2002 draft to support the reduction of the staff's recommended minimum flow over Lainhart Dam from 70cfs, in its May 2001 draft, to 35cfs. The modeling has not significantly changed between the two drafts to support such a drastic reduction.*

*In 2001, District staff recommended a minimum flow of 70cfs over Lainhart Dam in order to preserve the remaining freshwater habitat up to river mile 8.1 on the basis that as recently as 1970 a healthy bald cypress ecosystem resided in this area. It was the staff's intention, at that time, to keep the saltwater wedge near river mile 8.1. This year, staff has decided to reduce that recommended minimum by half, nearly to a level of flow that staff previously believed would be disastrous to the freshwater cypress forest:*

*"A continuous discharge from Lainhart Dam within the 30 cfs range would allow saltwater to penetrate as far as 9.0 miles upstream which is within the remaining "healthy" cypress zone. Allowing saltwater to penetrate this far upstream would set up the opportunity for saltwater contamination of the floodplain groundwater system that could potentially result in the stress or mortality to the remaining bald cypress community. Such an event would be considered significant harm to the water resources or ecology of the area."*

*30cfs is not much less than 35. Under the flow criteria proposed in the 2002 draft, wherein flows over Lainhart may be allowed to fall below 35cfs for up to 20 days at a time, it is reasonable to assume that the saltwater wedge will continue its encroachment upon the freshwater habitat. We have not found convincing hydrological support in the current document to justify such a marked change in recommended minimum flow.*

*The District acknowledges that a significant part of the National Wild & Scenic portion of the NW Fork was already seriously harmed by 1985. In our opinion, it was the responsibility of the District, as custodians of the River, to initiate restoration of the River at the time of its Wild & Scenic designation. All of the parties adopting the Loxahatchee Wild and Scenic River Management Plan are charge with preserving and enhancing the River to the fullest extent of its authority. To the extent that the District maintains the River in a damaged condition, neither preserved nor enhanced, it has failed to fulfill its agreement with the other agencies and the People of the State of Florida.*

**DISTRICT STAFF'S RESPONSE:**

It is the intent of the South Florida Water Management District to ensure that all planning documents produced by staff are based on sound scientific principles and information. As part of the process of developing MFL technical criteria for the Loxahatchee River, the District assembled an independent panel of experts to conduct a scientific peer review of the 2001 draft document, which proposed 70 cfs as a MFL for the NW Fork. Response from the peer review panel clearly indicated that this flow target was developed as a result of a policy decision of

where significant harm occurred, rather than from a scientific determination. The panel felt that establishing a specific salinity value for protection of the bald cypress community could not be supported by the technical information presented in the document (see page 5 from the final peer review panel report). Hence, additional field studies were conducted on the resource of concern (the freshwater floodplain swamp) and the locations of “healthy,” “stressed,” and “significantly harmed” freshwater swamp were defined and the flow required to protect the resource from significant harm was calculated.

In the first draft document, much emphasis was placed on bald cypress as the key indicator species. Our more recent field studies, as well as those of authors working in cypress forests in Louisiana and elsewhere, indicate that bald cypress can be somewhat salt tolerant. In fact, bald cypress is still found along portions of the River where other species (e.g. pop ash, dahoon holly, water hickory, and Virginia willow) have been lost due to salinity exposure. Because of this, bald cypress is not an appropriate indicator of floodplain “health” or the location of the remaining freshwater floodplain swamp.

The basis for establishing the MFL at a location in the floodplain swamp along the NW Fork, as it was described in 1985, was discussed previously in the response concerning comparison of 1984, 1985 and current aerial photos and FDEP vegetation maps.

In addition to this MFL, which is intended to achieve partial enhancement of the Northwest Fork of the Loxahatchee River to prevent significant harm, restoration of the Loxahatchee River beyond the MFL will be addressed pursuant to Rule 40E-8.421(6), F.A.C. and other applicable provisions of state law. The South Florida Water Management District commits to restore freshwater flows to the Northwest Fork of the River above the MFL through Chapter 373, F.S. and the Comprehensive Everglades Restoration Plan, Northern Palm Beach Project Implementation Report (NPB-PIR), and its associated authorities. The District will continue to partner with the FDEP to establish an achievable restoration goal and plan for the Loxahatchee River watershed that will be implemented through the NPB-PIR process. This MFL will be reviewed within two years of adoption and revised, if necessary, to ensure consistency with the restoration goal and plan identified pursuant to Rule 40E-8.421, F.A.C. or other applicable provisions of state law.





## **SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

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**ADM 02-06**

January 16, 2003

Environmental & Land Use Law Center, Inc.  
Ms. Lisa Interlandi  
224 Datura Street, Suite 201  
West Palm Beach, FL 33401

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Ms. Interlandi,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

[www.sfwmd.gov/org/wsd/mfl/loxmfl/peer.html](http://www.sfwmd.gov/org/wsd/mfl/loxmfl/peer.html)

The District's Governing Board voted unanimously in December 2002 to publish the final draft rule. We intend to begin implementation of this rule in March 2003. We appreciate your effort to provide us with comments and extend our thanks for your assistance in this process. Public participation was very valuable and the changes we made at the public's suggestion greatly enhanced the quality of the final product. The direct participation also allowed the District staff to better understand and address the concerns of the community. We look forward to continued partnership in future efforts within the Loxahatchee watershed, including the development of a long-term restoration program for the river.

Sincerely,

A handwritten signature in cursive script that reads "Michelle J. Percy".

Michelle J. Percy

Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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**ADM 02-06**

January 16, 2003

Loxahatchee River District  
Mr. Rick Dent  
2500 Jupiter Park Drive  
Jupiter, FL 33458

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Dent,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Michelle J. Percy  
Director  
Planning and Development Division  
Water Supply Department

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**ADM 02-06**

January 16, 2003

Department of Environmental Resources Management  
Mr. Richard Walesky  
3323 Belvedere Road, Building 502  
West Palm Beach, FL 33406

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Walesky,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Michelle J. Percy

Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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**ADM 02-06**

January 16, 2003

Seacoast Utility Authority  
Mr. Rim Bishop, Executive Director  
4200 Hood Road  
Palm Beach Gardens, FL 33410

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Bishop,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Michelle J. Percy  
Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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## **SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

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Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • [www.sfwmd.gov](http://www.sfwmd.gov)

**ADM 02-06**

January 16, 2003

Town of Jupiter Utilities  
Mr. David Brown  
P.O. Box 8900  
Jupiter, FL 33468

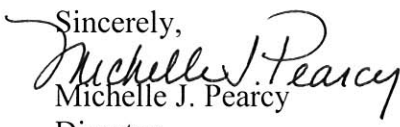
**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Brown,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Sincerely,  
  
Michelle J. Percy  
Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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Henry Dean, *Executive Director*



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**ADM 02-06**

January 16, 2003

Mr. Lloyd Brumfield  
11225 SW Meadowlake Circle  
Stuart, FL 34997

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Brumfield,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Sincerely,

  
Michelle J. Percy

Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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**ADM 02-06**

January 16, 2003

Ms. Catherine Dwore  
13105 Silver Fox Trail  
Palm Beach Gardens, FL 33418

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Ms. Dwore,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Sincerely,

A handwritten signature in cursive script that reads "Michelle J. Percy".

Michelle J. Percy  
Director  
Planning and Development Division  
Water Supply Department

MJP/nk

---

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**ADM 02-06**

January 16, 2003

Mr. Patrick Hayes  
Ideas & Things  
18809 S.E. Federal Highway  
Tequesta, FL 33467

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Hayes,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Sincerely,



Michelle J. Percy

Director

Planning and Development Division  
Water Supply Department

MJP/nk

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**ADM 02-06**

January 16, 2003

Mrs. Marge Ketter  
7088 SE Rivers Edge  
Jupiter, FL 33458

**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mrs. Ketter,

On behalf of the South Florida Water Management District, I want to thank you for your participation in the development of the Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River. We received and carefully considered your reviews and comments on the July 2002 Draft Document entitled "Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River." Where specific editorial errors were pointed out, these corrections were made to the draft document. Other comments were addressed either by providing clarification within the document text, in the rule making process, or by responses to similar comments that have been posted on the District website at:

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Sincerely,  
  
Michelle J. Percy  
Director  
Planning and Development Division  
Water Supply Department

MJP/nk

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**ADM 02-06**

January 16, 2003

Mr. Alfred Mueller, Jr.  
5505 Center Street  
Jupiter, FL 33458

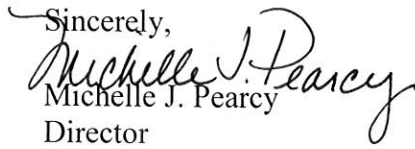
**Subject: Review Comments**  
**Minimum Flows and Levels- NW Fork of the Loxahatchee River**

Dear Mr. Mueller, Jr.,

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Sincerely,  
  
Michelle J. Percy  
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